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OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS

March 12, 1985

U.S. DEPARTMENT OF COMMERCE

Patent and Trademark Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

OFFICIAL GAZETTE of the UNITED STATES PATENT AND TRADEMARK OFFICE

March 12, 1985 Volume 1052 Number 2

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APR 23 1985
ENGINEERING LIBRARY

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.00 each; PLANT PATENTS in color, $8.00 each; copies of TRADEMARKS at $1.00 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1050 O.G. 330 on Jan. 15, 1985.

For use of the European Patent Office as a Searching Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

Domestic PCT fees were increased on Oct. 1, 1982 by a rule change to 37 CFR 1.445 that was published in the *Official Gazette* at 1021 O.G. 11 on Aug. 10, 1982.

The Search fee for the European Patent Office was changed as of Jan. 3, 1985 and was announced in the *PCT Gazette* at No. 26/1984 page 3241 on Nov. 8, 1984.

International PCT fees were changed by the PCT Assembly effective Jan. 1, 1985 and were announced in the *Official Gazette* at 1050 O.G. 330 on Jan. 15, 1985.

The current schedule of PCT fees is as follows:

Transmittal fee	$ 125.00
Search fee	
U.S. Patent and Trademark Office as Searching Authority	
• No corresponding prior U.S. national application filed	500.00
• Corresponding prior U.S. national application filed	250.00
European Patent Office as Searching Authority	
• All cases	690.00
International fees	
Basic fee (first 30 pages)	265.00
Basic Supplemental fee (for each page over 30)	5.00
Designation fee (for each national or regional office)	64.00
Designation fee for 11th and subsequent designations	no charge

GERALD J. MOSSINGHOFF,
Commissioner of Patents and Trademarks.

Dec. 24, 1984.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), effective Nov. 1, 1984. If the maintenance fee is not paid in a patent requiring such payment, the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on Mar. 9, 1982 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Plant Patents	None
Utility Patents	4,318,189 through 4,319,360

Reissue Patents based on the above identified patents.

No maintenance fees are required for design patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months are set forth in 37 CFR 1.20(e) and (h), which are reproduced below:

37 CFR §1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant . . . $ 200.00"

"(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f))	$ 200.00
By other than a small entity	$ 400.00"

The amounts of the surcharges, effective Nov. 1, 1984, are set forth in 37 CFR 1.20(k)-(m), which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 . . . . . $ 100.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity (§1.9(f))	$ 50.00
By other than a small entity	$ 100.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee on a patent based on an application filed on or after Aug. 27, 1982, where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable . . . . . $ 500.00"

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.19(a)).

4,181,602, Re. S.N. 681,228, Filed Dec. 13, 1984, Cl. 208/216pp, PROCESS FOR THE HYDROTREATING OF HEAVY HYDROCARBON STREAMS, Leonard M. Quick, et al., Owner of Record: *Standard Oil Co. (Ind.), Chicago, Ill.,* Attorney or Agent: W. T. McClain, et al., Ex. Gp.: 116

4,401,335, Re. S.N. 672,918, Filed Nov. 19, 1984, Cl. 294/084, BOAT HOIST, Byron L. Godbersen, Owner of Record: *Inventor,* Attorney or Agent: H. Robert Henderson, et al., Ex. Gp.: 313

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

No Publications This Issue.

U.S. GOVERNMENT-OWNED INVENTIONS
Notice of Availability for Licensing

The inventions listed below are owned by agencies of the U.S. Government and are available for licensing in the U.S. in accordance with 35 U.S.C. 207 to achieve expeditious commercialization of results of federally funded research and development. Foreign patents are filed on selected inventions to extend market coverage for U.S. companies and may also be available for licensing.

Technical and licensing information on specific inventions may be obtained by writing to:

Office of Federal Patent Licensing
U.S. Department of Commerce
P.O. Box 1423
Springfield, Va. 22151

Please cite the number and title of inventions of interest.

DOUGLAS J. CAMPION,
Office of Federal Patent Licensing
National Technical Information Service
U.S. Department of Commerce.

DEPARTMENT OF AGRICULTURE

SN 6-423,402. MICROEMULSIONS FROM VEGETABLE OIL AND AQUEOUS ALCOHOL WITH 1-BUTANOL SURFACTANT AS ALTERNATIVE FUEL FOR DIESEL ENGINES.

SN 6-426,438 (4,488,996). RAPID PRODUCTION OF ISPROPENYL ESTERS.

SN 6-436,497 (4,489,161). STRAIN OF TRICHODERMA VIRIDE TO CONTROL FUSARIUM WILT.

SN 6-461,299 (4,474,991). SYNTHETIC PHEROMONE 10-METHYL-2-TRIDECANONE AND ITS USE IN CONTROLLING THE SOUTHERN CORN ROOTWORM AND RELATED DIABROTICITES.

SN 6-586,618 (4,488,878). PROCESS TO PRODUCE DURABLE PRESS LOW FORMALDEHYDE RELEASE CELLULOSIC TEXTILES.

SN 6-600,259. UNNATURAL SEX ATTRACTANTS FOR MALE PINK BOLLWORMS AND PINKSPOTTED BOLLWORMS AND USE THEREOF.

DEPARTMENT OF HEALTH AND HUMAN SERVICES

SN 6-664,953. BIOLOGICALLY-ACTIVE XANTHINE DERIVATIVES.

SN 6-672,451. ISOLATION AND CULTURE OF ADRENAL MEDULLARY ENDOTHELIAL CELLS PRODUCING BLOOD CLOTTING FACTOR VIII: C.

DEPARTMENT OF INTERIOR

SN 6-473,298 (4,491,971). SHORT RANGE TRAPPED MINER LOCATOR.

SN 6-574,499 (4,489,044). FORMATION OF TUNGSTEN MONOCARBIDE FROM A MOLTEN TUNGSTATE HALIDE PHASE BY A GAS SPARGING.

DEPARTMENT OF THE AIR FORCE

SN 6-473,384. LOW VOLTAGE TWO WIRE TO FOUR WIRE TELEPHONE CIRCUIT CONVERTER APPARATUS.

SN 6-569.644. TROPOSPHERIC SCATTER COMMUNICATION SYSTEM HAVING ANGLE DIVERSITY.

SN 6-610,148. SURVIVABLE LOCAL AREA NETWORK.

SN 6-610,911. MASK ALIGNER FOR SOLAR CELL FABRICATION.

SN 6-610,912. METHOD FOR MAKING HETEROCYCLIC BLOCK COPOLYMERS.

SN 6-610,913. CONTACT INSERTION AND WIRE LAY ROBOTIC END EFFECTOR APPARATUS.

SN 6-616,380. ONE-PIECE HPTR BLADE SQUEALER TIP.

SN 6-618,287. NOISE JAMMER DISCRIMINATION BY NOISE MODULATION BANDWIDTH.

SN 6-657,097. MECHANICAL LOCKING BETWEEN MULTI-LAYER PRINTED WIRING BOARD CONDUCTORS AND THROUGH-HOLE PLATING.

SN 6-661,623. METHOD FOR SYNTHESIZING INDIUM PHOSPHIDE.

SN 6-661,833. FINE FIGURING ACTUATOR.

SN 6-662,476. OPTICAL MARK READER.

SN 6-664,193. IMPROVED MAGNETIC BIAS AND DELAY LINEARITY IN A MAGNETOSTATIC WAVE DELAY LINE.

SN 6-666,511. EXTRACTING DIGITAL DATA FROM A BUS AND MULTIPLEXING IT WITH A VIDEO SIGNAL.

SN 6-666,784. TRANDIGITIZER FOR RELAYING SIGNALS FROM GLOBAL POSITIONING SYSTEM (GPS) SATELLITES.

SN 6-666,785. VARIABLE DENSITY FRANGIBLE PROJECTILE.

SN 6-666,786. VIBRATION ISOLATED COLD PLATE ASSEMBLY.

SN 6-666,841. BISTATIC COHERENT RADAR RECEIVING SYSTEM.

SN 6-667,194. DIFFRACTION DIFFUSION SCREEN WITH HOLOGRAPHICALLY-SUPPRESSED ZERO-ORDER BEAM.

SN 6-671,391. MISSILE LAUNCHER INTEGRAL SHOCK ISOLATION AND RUNNING GEAR SYSTEM.

SN 6-671,393. CONFORMAL PHASED ARRAY ANTENNA PATTERN CORRECTOR.

SN 6-672,237. METHOD FOR CONTINUOUSLY CASTING.

SN 6-672,239. HIGH VOLTAGE DISCONNECT PROTECTION.

SN 6-675,173. DOUBLE PINCH-PUSH CONTACT INSERTION END-EFFECTOR.

SN 6-675,174. CHARGE DEPLETION METER

DEPARTMENT OF THE ARMY

SN 6-328,766 (4,376,663). METHOD FOR GROWING AN EPITAXIAL LAYER OF CDTE ON AN EPITAXIAL LAYER OF HGCDTE ON A CDTE SUBSTRATE.

SN 6-497,455 (4,473,494). PREPARATION OF STROMA-FREE, NON-HEME PROTEIN-FREE HEMOGLOBIN.

SN 6-658,945. POLYACTIC-POLYGLYCOLIC ACID COPOLYMER COMBINED WITH DECALCIFIED FREEZE-DRIED BONE FOR USE AS A BONE REPAIR MATERIAL.

SN 6-660,574. SEALING ASSEMBLY.

SN6–667,315. CURVILINEAR SOLID PROPELLANT GRAIN.
SN 6–669,131. TIRE DEFLATION MECHANISM.
SN 6–669,911. ADJUSTMENT STRUCTURE.
SN 6–672,056. TIRE INFLATION/DEFLATION SYSTEM.
SN 6–675,916. AN ELECTRONICALLY CONTROLLED ARRAY FOR SIMULATION OF PASSIVE TARGET/BACKGROUND SIGNATURES AT MILLIMETER WAVELENGTHS.
SN 6–679,432. HOIST.
SN 6–679,969. INTEGRATED CIRCUIT TUNABLE CAVITY OSCILLATOR.
SN 6–679,970. FILTER REFLECTION IMAGE GUIDE OSCILLATOR AND SOLID STATE LINE SCANNING DEVICE.
SN 6–679,971. IMAGE LINE VOLTAGE CONTROLLED OSCILLATOR WITH REPLACEABLE COMPONENTS.
SN 6–679,972. A COAXIAL CAVITY GUNN OSCILLATOR USING PROBE COUPLED MICROSTRIP.
SN 6–679,974. AN INTEGRATED VARACTOR TUNED COAXIAL GUNN OSCILLATOR FOR 60 GH, OPERATION.
SN 6–681,733. METHOD OF HEATING QUARTZ RESONATORS.
SN 6–682,126. DIGITAL HIGH SPEED PROGRAMMABLE CONVOLVER.
SN 6–685,426. LIGHTWEIGHT CLADDING FOR MAGNETIC CIRCUITS.

Department of the Treasury
United States Customs Service
Application for Recordation of Trade Name:
"NEENAH FOUNDRY CO."

Agency: U.S. Customs Service, Department of the Treasury
Action: Notice of Application for Recordation of Trade Name
Summary: Application has been filed pursuant to section 133.12, Customs Regulations (19 CFR 133.12), for the recordation under section 42 of the Act of July 5, 1946, as amended (15 U.S.C. 1124), of the trade name "NEENAH FOUNDRY CO." used by Neenah Foundry Co., a corporation organized under the laws of the State of Wisconsin, located at 2121 Brooks Ave., (P.O. Box 729), Neenah, Wis. 54956.

The application states that the trade name is used in connection with construction castings manufactured in the United States.

Before final action is taken on the application, consideration will be given to any relevant data, views, or arguments submitted in writing by any person in opposition to the recordation of this trade name. Notice of the action taken on the application for recordation of this trade name will be published in the Federal Register.
Date: Comments must be received on or before Apr. 1, 1985.
Address: Written comments should be addressed to the Entry, Licensing and Restricted Merchandise Branch, 1301 Constitution Ave., NW., Room 2417, Washington, D.C. 20229.
For Further Information Contact: Harriet Lane, Entry, Licensing and Restricted Merchandise Branch, U.S. Customs Service, 1301 Constitution Ave., NW., Washington, D.C. 20229 (202-566-5765).

DONALD W. LEWIS,
Jan. 25, 1985. *Director, Entry Procedures and Penalties Division.*

Department of the Treasury
United States Customs Service
(T.D. 85–7)
Recordation of Trade Name:
"ACME PREMIUM SUPPLY CORP."

Agency: U.S. Customs Service, Department of the Treasury
Action: Notice of Recordation
Summary: On Sept. 24, 1984, a notice of application for the recordation under section 42 of the Act of July 5, 1946, as amended (15 U.S.C. 1124), of the trade name "ACME PREMIUM SUPPLY CORP." was published in the Federal Register (49 FR 37507). The notice advised before final action is taken on the application, consideration would be given to any relevant data, views, or arguments submitted in opposition to the recordation and received not later than Nov. 23, 1984. No responses were received in opposition to the notice.

Accordingly, as provided in section 133.14, Customs Regulations (19 CFR 133.14), the name "ACME PREMIUM SUPPLY CORP." is recorded as the trade name used by Acme Premium Supply Corp., a corporation organized under the laws of the State of Missouri, located at 4100 Forest Park Blvd., St. Louis, Mo. 63108. The trade name is used in connection with the following merchandise manufactured in China, Taiwan, Korea and Hong Kong: stuffed toys, inflatable toys, plastic toys, novelty items, hats, caps and figurines.
Date: Jan. 17, 1985.
For Further Information Contact: Harriet Lane, Entry, Licensing and Restricted Merchandise Branch, U.S. Customs Service, 1301 Constitution Ave., NW., Washington, D.C. 20229 (202-566-5765).

DONALD W. LEWIS,
Jan. 14, 1985. *Director, Entry Procedures and Penalties Division.*

Department of the Treasury
United States Customs Service
(T.D. 85–6)
Recordation of Trade Name:
"L.A. GEAR CALIFORNIA, INC."

Agency: U.S. Customs Service, Department of the Treasury
Action: Notice of Recordation
Summary: On Sept. 25, 1984, a notice of application for the recordation under section 42 of the Act of July 5, 1946, as amended (15 U.S.C. 1124), of the trade name "L.A. GEAR CALIFORNIA, INC." was published in the Federal Register (49 FR 37688). The notice advised that before final action was taken on the application, consideration would be given to any relevant data, views, or arguments submitted in opposition to the recordation and received not later than Nov. 26, 1984. No responses were received in opposition to the notice.

Accordingly, as provided in section 133.14, Customs Regulations (19 CFR 133.14), the name "L.A. GEAR CALIFORNIA, INC." is recorded as the trade name used by L.A. Gear California, Inc., a corporation organized under the laws of the State of California, located at 122 West 25th St., Los Angeles, Calif. 90007. The trade name is used in connection with the following merchandise manufactured in Hong Kong, Taiwan, Korea, Brazil and the United States: men's, women's and children's sportswear (specifically shirts, skirts, shorts, pants, dresses, jackets and jumpsuits); footwear, fashion accessories (specifically hosiery, leather and nylon handbags, and carrying bags).
Date: Jan. 17, 1985.
For Further Information Contact: Harriet Lane, Entry, Licensing and Restricted Merchandise Branch, U.S. Customs Service, 1301 Constitution Ave., NW., Washington, D.C. 20229 (202-566-5765).

DONALD W. LEWIS,
Jan. 14, 1985. *Director, Entry Procedures and Penalties Division.*

Printing Changes Affecting the Official Gazette for Trademarks, Registration Certificates, and Modifications to Registration Certificates (Flag Pages)

The following changes are being made in the format of the Official Gazette and registration certificates be-

cause of new printing methods being employed by the Patent and Trademark Office.

Official Gazette and Registration Certificate Changes: Effective Apr. 2, 1985

The entire printed text of the Official Gazette entries and the body of the Registration Certificates will appear in upper case letters.

The printing format of the names of "individual" applicants will appear in the following form—Last Name, First Name, Middle Initial (Example: SMITH, JOHN B.).

The printing of special textual characters, such as accent or diacritical marks, will be eliminated from *all* printed text. Only those special characters which form a part of a mark depicted in special form will be printed.

Official Gazette Changes: Effective Apr. 2, 1985

A new format will be adopted for the Official Gazette section entitled, "Trademark Registrations Amended, Corrected, Etc." The format will be similar to the format used for marks published for opposition. At the bottom of each entry will be a list of the elements of the registration which have been amended, corrected, or restricted. Elements which have been added will be indicated by asterisks and elements which have been deleted will be indicated by brackets.

Changes to the identification of goods/services will be indicated by use of the following punctuation: asterisks for additional words and brackets for deleted words.

Modifications to Registration Certificates: Effective Apr. 2, 1985

The separate documents (flag pages) currently issued to show amendments, corrections, and other changes to registration certificates will be eliminated. Instead, updated registration certificates will be issued. The updated registration certificate will be a reduced size version of the entire registration, including the modification. The heading of the updated registration certificate will identify the nature of the modification, i.e. amendment, correction, etc. Modifications to the identification of goods/services will be indicated by use of the following punctuation: asterisks for additional words and brackets for deleted words.

Notification of the modification of a registration will continue to appear in the section of the Official Gazette entitled, "Trademark Registrations Amended, Corrected, Etc." The date of publication will be the effective date of the modification.

Feb. 6, 1985.

MARGARET M. LAURENCE,
Assistant Commissioner,
for Trademarks.

Trademark Expo '85

The Third Annual National Trademark Expo will be held on July 27–28 in the Great Hall of the Department of Commerce in Washington, D.C. The exhibition, which is open to the public free of charge, attracted over 14,000 visitors last year. Co-sponsored by the PTO's Trademark Examining Operation and The United States Trademark Association, the Expo demonstrates the importance of trademarks to business and consumers. The theme this year is "Trademarks: Key to American Enterprise."

Trademark owners and those in the trademark field are invited to participate in Expo '85. It is a unique opportunity to demonstrate the importance of trademarks and to educate consumers about proper trademark usage. The only requirement is that the exhibit involve trademarks. For example, the exhibit can show how trademarks identify the source of goods or services, or show how a trademark has evolved. Personified trademarks, audio-visual displays, product samples and informational literature are all successful attention grabbers.

The fee for an exhibit space 10 feet wide and 8 feet deep is $250. Requests for applications should be addressed to:

Margaret M. Laurence
Trademark Expo '85
U.S. Patent and Trademark Office
Washington, D.C. 20231

or call John P. Rynkiewicz, Chairman, Trademark Expo Committee, at (703) 557-3273, or Ann Farson, Assistant, at (703) 557-3268, for further information.

Applications must be submitted by May 1, 1985.

Jan. 25, 1985.

MARGARET M. LAURENCE,
Assistant Commissioner,
for Trademarks.

Marks Published for Opposition

The April issues of the OFFICIAL GAZETTE (Trademark Section) will present marks published for opposition in two separate sections.

Each section will contain both multiple class and single class applications. The first section will be printed at the beginning of the OFFICIAL GAZETTE and the second section will be printed at the end of the OFFICIAL GAZETTE, after the Index of Registrants.

The second section will be numbered separately from the first section, and each page will bear the notation Ap.

Jan. 10, 1985.

MARGARET M. LAURENCE,
Assistant Commissioner
for Trademarks.

PATENT NOTICES

Certificates of Correction for the Week of Mar. 12, 1985

Re. 31,212	4,442,685	4,458,522	4,468,362
3,758,441	4,442,911	4,459,073	4,468,614
4,171,431	4,443,450	4,459,080	4,468,616
4,215,111	4,443,868	4,459,401	4,468,622
4,257,463	4,443,971	4,459,549	4,468,855
4,308,279	4,444,145	4,459,577	4,468,962
4,321,068	4,444,557	4,460,448	4,469,063
4,322,372	4,444,940	4,460,741	4,469,467
4,324,855	4,444,967	4,460,751	4,469,491
4,348,256	4,445,020	4,460,861	4,469,762
4,348,521	4,445,082	4,461,833	4,470,153
4,351,717	4,445,521	4,462,587	4,470,433
4,356,216	4,446,013	4,462,648	4,470,745
4,364,525	4,446,403	4,462,804	4,470,934
4,370,649	4,446,874	4,462,825	4,470,961
4,382,873	4,447,241	4,462,933	4,471,108
4,385,804	4,447,496	4,463,015	4,471,202
4,391,176	4,447,576	4,463,268	4,471,578
4,397,295	4,448,448	4,463,570	4,471,685
4,398,094	4,448,644	4,463,690	4,471,899
4,400,364	4,448,980	4,463,722	4,471,915
4,403,319	4,449,248	4,464,094	4,472,096
4,404,027	4,449,598	4,464,175	4,472,162
4,405,993	4,450,535	4,464,267	4,472,395
4,414,348	4,451,068	4,464,392	4,472,595
4,417,012	4,451,306	4,464,496	4,472,712
4,417,895	4,451,449	4,464,658	4,472,845
4,418,468	4,452,447	4,464,750	4,472,927
4,419,618	4,453,029	4,465,069	4,472,928
4,420,072	4,453,414	4,465,297	4,473,014
4,420,642	4,453,597	4,465,344	4,473,106
4,421,074	4,453,627	4,465,483	4,473,175
4,422,836	4,453,725	4,465,754	4,473,238
4,423,675	4,453,824	4,465,921	4,473,256
4,426,466	4,454,251	4,465,965	4,473,551
4,427,584	4,455,633	4,466,076	4,474,364
4,430,326	4,455,887	4,466,286	4,474,650
4,431,377	4,456,106	4,466,466	4,474,652
4,432,813	4,456,151	4,466,499	4,474,693
4,433,039	4,456,566	4,466,561	4,474,881
4,436,823	4,456,567	4,466,573	4,475,154
4,438,230	4,456,615	4,466,930	4,475,266
4,438,582	4,456,911	4,466,988	4,475,403
4,439,422	4,457,427	4,467,200	4,475,949
4,439,972	4,457,434	4,467,210	4,478,558
4,440,695	4,457,601	4,467,730	4,478,652
4,440,918	4,457,721	4,467,968	4,479,126
4,441,581	4,458,066	4,468,062	4,479,295
4,442,120	4,458,187	4,468,181	4,480,978
4,442,611	4,458,243	4,468,312	4,485,162

Disclaimers

3,701,346.—*Charles T. Patrick, Jr.;* and *Roman Szpur,* Dayton, Ohio. MEDICAL ELECTRODE. Patent dated Oct. 31, 1972. Disclaimer filed Dec. 20, 1984, by the assignee, *NDM Corp.*

Hereby enters this disclaimer to claims 1 and 8 of said patent.

4,152,598.—*Peter A. E. Stewart,* Bristol, England. LUBRICANT DISTRIBUTION DETERMINATION BY NEUTRON RADIOGRAPHY. Patent dated May 1, 1979. Disclaimer filed Jan. 18, 1985, by the assignee, *Rolls-Royce (1971) Ltd.*

Hereby enters this disclaimer to all claims of said patent.

4,408,311.—*Junichi Suzuki,* Kawasaki; and *Kenji Shintani,* Tokyo, Japan. OPTICAL TRACKING APPARATUS. Patent dated Oct. 4, 1983. Disclaimer filed Nov. 1, 1984, by the assignee, *Sony Corp.*

Hereby enters this disclaimer to all claims of said patent.

Dedications

3,406,757.—*August B. Baumstimler,* Odessa, Tex. WELL CLEAN-OUT TOOL. Patent dated Oct. 22, 1968. Dedication filed Jan. 30, 1984, by the inventor.

Hereby dedicates the remaining term of said patent.

4,085,705.—*Thomas M. Gland* and *Robert C. A. Frederickson,* Indianapolis, Ind. ANIMAL CAGE. Patent dated Apr. 25, 1978. Dedication filed May 27, 1980, by the assignee, *Eli Lilly and Co.*

Hereby dedicates to the Public the entire term of said patent.

Disclaimer and Dedication

3,692,503.—*Ira Kukin,* West Orange, N.J. ACTIVATED MANGANESE CONTAINING ADDITIVE FOR FUELS. Patent dated Sept. 19, 1972. Disclaimer and Dedication filed Mar. 10, 1983, by the assignee, *Economics Laboratory, Inc.*

Hereby disclaims and dedicates to the Public the entire term of said patent.

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	San Diego Public Library	(619) 236-5813
	Sunnyvale: Patent Information Clearinghouse*	(408) 738-5580
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	Boston Public Library	(617) 536-5400 Ext. 265
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	Columbus: Ohio State University Libraries	(614) 422-6286
	Toledo/Lucas County Public Library	(419) 255-7055 Ext. 212
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*Collection organized by subject matter.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

JAMES E. DENNY, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF January 19, 1985

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	7-25-83
ORGANIC CHEMISTRY AND BIOTECHNOLOGY, GROUP 120—C. E. VAN HORN, Director	6-01-83
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director	5-02-83
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	1-24-83
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—G. GOLDBERG, Director	8-01-81
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	10-12-80
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—E. LEVY, Director	1-12-81
RECEPTACLES, CLEANING, WINDING, AND MEASURING, GROUP 240—G. M. FORLENZA, Director	5-03-83
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—S. S. MATTHEWS, Director	10-01-80
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260—S. G. KUNIN, Director	2-13-80
DESIGN, GROUP 290—K. L. CAGE, Director	9-23-82
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	4-17-83
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—S. N. ZAHARNA, Director	3-19-83
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—R. E. AEGERTER, Director	10-29-82
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—D. J. STOCKING, Director	12-21-81
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	12-04-81

Expiration of patents: The patents within the range of numbers indicated below expire during January 1985, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,360,800 to 3,366,969, inclusive

Plant Patents ..... Numbers 2,784 to 2,793 inclusive

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 31,845

RELAY VALVE FOR FLUID ACTUATORS

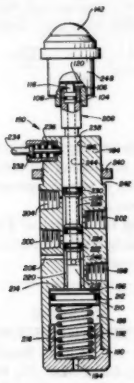
Clifford M. Peters, Longview, Tex., assignor to Joy Manufacturing Company, Pittsburgh, Pa.

Original No. 4,256,141, dated Mar. 17, 1981, Ser. No. 57,490, Jul. 13, 1979. Application for reissue Dec. 13, 1982, Ser. No. 449,313

Int. Cl.³ F15B *13/01, 20/00*

U.S. Cl. 137—557

10 Claims



[5. In a pilot operated relay valve having a valve body, a slide valve mounted in the body for longitudinal movement between an open position to direct pressurized fluid to an actuator and a closed position to bleed fluid from the actuator, means biasing said slide valve to the closed position, manually accessible means on the slide valve adapted to be manually manipulated to effect longitudinal movement of the slide valve from the closed position to the open position for manual setting of the slide valve, a piston carried on the slide valve, and a pilot port in the valve body in fluid communication with said piston in the open position of the slide valve to apply the fluid pressure of said pilot port to the piston for holding of the slide valve in the open position, the improvement comprising:

a vent port in the valve body in fluid communication with the pilot port in the closed position of the slide valve to vent fluid pressure applied to the pilot port when the slide valve is in the closed position, thereby preventing fluid pressure at the pilot port from moving the slide valve from the closed position to the open position; and

means for sealing said vent port from said pilot port in the open position of the slide valve to permit application of pilot pressure to the piston for holding of the slide valve in the open position.]

10. A pilot operated relay valve for controlling flow from a first fluid pressure source to a valve actuator in response to fluid pressure changes in a pilot line in fluid communication with a second fluid pressure source, said relay valve comprising:

an elongate valve body presenting a longitudinal bore having a small diameter portion and a connected enlarged diameter portion defining a piston chamber in the valve body, said valve body having an inlet port in fluid communication with said first fluid pressure source, an outlet port in fluid communication with the valve actuator, and a bleed port for bleeding fluid from the actuator;

an elongate slide valve mounted in said bore for longitudinal movement between an open position wherein fluid is directed from said first fluid source through said inlet and outlet ports to said valve actuator and a closed position wherein fluid is bled from the actuator through said bore and said bleed port, said slide valve including a small diameter stem having an enlarged diameter piston on an end thereof in the piston chamber adjacent one end of said body and an outer end portion located outside of the opposed end of said valve body;

means biasing said slide valve and outer end portion outwardly away from said valve body toward said closed position;

a knob on said outer end portion of the slide valve adapted to be manually pushed toward said valve body to move the slide valve inwardly from the closed position to the open position against the bias of said biasing means, said piston having a fluid pressure face facing said knob and said opposed end of the valve body;

a pilot port extending through a side of said elongate valve body between the knob and piston adapted for connection with the pilot line to receive and sense the fluid pressure therein, said slide valve and said body defining in the small diameter bore portion therebetween an annular pilot fluid chamber adjacent the pilot port positioned in the closed position of the slide valve about and generally along the length of the slide valve between the fluid pressure face of said piston and said pilot port, said pilot port and annular pilot fluid chamber being in fluid communication with the piston chamber and pressure face of said piston in the open position of the slide valve to apply the pilot line pressure to said piston for holding the slide valve in open position when the pilot line pressure is sufficient to overcome the force of said biasing means;

first sealing means about said small diameter stem positioned longitudinally thereof between the knob and pressure face of the piston to block fluid pressure outwardly of said pilot fluid chamber, second sealing means about the piston to seal between the piston and valve body in at least the open position of the slide valve, said first and second sealing means defining said annular pilot fluid chamber and said piston chamber therebetween in the open position of the slide valve and permitting fluid to be vented from the pilot fluid chamber upon movement of the slide valve from open position to closed position;

fluid passage means in said slide valve in fluid communication with said annular pilot fluid chamber under all conditions of operation in said open position, said fluid passage means including a fluid passage extending longitudinally of said stem along the length thereof generally between the knob and piston, and a cross port extending from and generally transversely of said longitudinally extending fluid passage through said small diameter stem at a position between the fluid pressure face of said piston and said first sealing means to provide fluid communication between the pilot port and fluid passage means;

visual indicator means on said knob responsive to fluid pressure in said fluid passage means having a first condition indicating the open position of the slide valve and a second condition indicating the closed position of the slide valve; and

means effecting the first condition of said indicator means when said fluid passage means is exposed to fluid pressure above a predetermined level and the second condition of said indicator means when the fluid pressure in said fluid passage means is below said predetermined level.

Re. 31,846
SILVER, CADMIUM OXIDE, LITHIUM CARBONATE CONTACT MATERIAL AND METHOD OF MAKING THE MATERIAL

Frank S. Brugner, Jr., Clearwater, Fla., assignor to Square D Company, Palatine, Ill.

Original No. 4,293,337, dated Oct. 6, 1981, Ser. No. 68,038, Aug. 20, 1979. Application for reissue Apr. 22, 1983, Ser. No. 487,630

Int. Cl.[3] **B22F** *3/00;* **C22C** *29/00*

U.S. Cl. 75—232 **19 Claims**

1. A process of forming an improved electrical contact for electrical power applications and made with a first starting material selected from a group essentially consisting of a first metal in powder form and reducible compounds of the first metal in powder form both having a selected maximum particle size, and with a second starting material selected from a group essentially consisting of a second metal in powder form, reducible compounds of the second metal in powder form, and mixtures of the second metal in powder form all having a selected maximum particle size with said second metal selected to be more readily oxidizable than the first metal under similar environmental conditions and added in an amount from a minimum effective amount up to the maximum limit of solubility of the second metal in the first metal by mixing the first and second starting materials together to obtain a mixture having a substantially even dispersion of the first and second starting materials, heating the mixture in a reducing atmosphere at a temperature below the melting temperature of the alloy of the first and second metals in the proportions present to alloy the first and second metals in a powder form; sieving the alloyed mixture to produce a selected maximum particle size; heating the sieved mixture in an oxidizing atmosphere at a temperature and under conditions selected to substantially completely oxidize the second metal and with said temperature below the melting temperature of the alloy of the first and second metals in the proportions present to thereby maintain the *oxidized* mixture in a powder form; and sieving the oxidized mixture to produce a *powdered material having a* selected maximum particle size, said process comprising adding at a selected time during the process lithium [metal] in the form of lithium carbonate particles with the lithium carbonate particles uniformly distributed throughout *the powdered* material, forming a compact of the powdered material to provide an electrical contact having *uniformly distributed constituents and* a desired shape, size and density, and sintering the compact for a predetermined time at a temperature less than the decomposition temperature of the lithium carbonate to provide a sintered electrical contact.

6. A sintered electrical contact for use as switching contacts in power circuits consisting essentially of silver, cadmium and lithium with silver present in a metallic form, the cadmium present as cadmium oxide and the lithium present as lithium carbonate[.] *that is uniformly distributed throughout the contact material in an amount of 0.001 to 0.01 weight percent of the contact material.*

Re. 31,847
APPARATUS AND METHOD FOR PRODUCING IMAGES CORRESPONDING TO PATTERNS OF HIGH ENERGY RADIATION

George W. Luckey, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

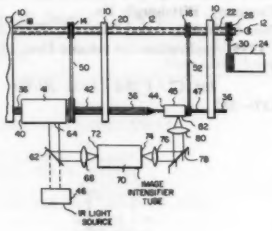
Original No. 3,859,527, dated Jan. 7, 1975, Ser. No. 320,028, Jan. 2, 1973. Application for reissue Dec. 5, 1983, Ser. No. 558,394

Int. Cl.[3] **G03C** *5/16*

U.S. Cl. 250—327.2 **65 Claims**

1. An apparatus for producing an image corresponding to [a] *an incident x-ray image* pattern [of radiation of a first wavelength], using a medium [for] releasably storing an *energy* image *pattern* representative of [the] *such incident x-ray image* pattern, said apparatus comprising:

means for [applying a second wavelength of radiation to] *scanning successive sub-areas of* said image storage medium *with a beam of low energy radiation of a second wavelength* to cause [said] *respective* storage medium *sub-areas sequentially* to [emit a third wavelength of] *release the stored energy in the form of sequential, photoelectrically detectable* radiation [having] *emissions of a third wavelength which constitute* an intensity pattern representative of the stored image;



means for *sequentially* sensing the third wavelength radiation *emissions* and for producing *an* electrical [energy in accordance therewith] *signal representative of the incident x-ray image pattern*; and

means for converting the electrical [energy] *signal* into an image corresponding to the [pattern of first wavelength radiation] *x-ray image.*

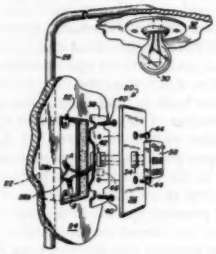
Re. 31,848
ELECTRONIC ASSEMBLY

Ole K. Nilssen, Caesar Dr., R.R. 5, Barrington, Ill. 60010

Original No. 4,259,618, dated Mar. 31, 1981, Ser. No. 937,452, Aug. 28, 1978. Application for reissue Mar. 22, 1982, Ser. No. 360,228

Int. Cl.[3] **H05B** *37/02, 37/04, 41/36*

U.S. Cl. 315—360 **26 Claims**



1. An electronic assembly operable to control the switching of a single leg of an electrical load circuit connected to a power source and adapted for mounting at a standard electrical wall-switch box having a face plate with a single central aperture therein, said assembly comprising:

electrically actuatable load circuit switching means disposed within the wall-switch box,

a multiple-conductor receptacle being connected to the load switching means and mounted in alignment with the aperture of the face plate and

a plug-in programming means adapted for placement exteriorly of the face plate and having a multiple-conductor plug insertable through the aperture to engage the receptacle;

whereby said programming means operates said circuit switching means for controlled energization of the electrical load.

12. An electronic wall-switch product adapted: (i) to be mounted at a standard electrical wall-switch box in lieu of an ordinary mechanical wall-switch, said wall-switch box having a pair of wires coming thereinto, (ii) to be used and mounted in combination with an ordinary wall-switch face plate having an aperture therein, and (iii) to be used for energizing an electrical load in accordance with a preset time program; said time program being controllably changeable in part and/or in its entirety; said product, after having been mounted at said wall-switch box, comprising:

mounting means fastened onto said wall-switch box;

electrically actuatable switching means mounted onto said mounting means, connected in circuit with said pair of wires, and operable to cause electrical connection and/or non-connection therebetween in response to electrical actuation signals; and

programmable electronic timer means connected in circuit with said switching means and operable to provide said actuation signals in accordance with said time program, said timer means having: (i) programming control means operative to accept manual programming instructions productive of changing part and/or all of said preset time program, and (ii) display means operative to provide visually discernible indication of the manual programming instructions having been accepted by said manual programming input means; said programming control means being manually accessible from the outside of said face plate said display means being visually discernible from the outside of said face plate;

whereby said wall-switch product is capable, by way of coupling means mounted in alignment with and coupling through said aperture, of being used with a standard wall-switch face plate having but a single aperture therein while also being capable of energizing said electrical load in accordance with said preset time program even though connected with but a single pair of wires.

PLANT PATENTS

GRANTED MARCH 12, 1985

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

5,413

PLUM TREE 'MR. PAUL'

Ronald Paul, 5485 E. Heaton Ave., Fresno, Calif. 93727

Filed Feb. 11, 1983, Ser. No. 465,876

Int. Cl.[3] A01H *5/00*

U.S. Cl. Plt.—38 **1 Claim**

1. A new and distinct variety of plum tree having the cultivar name 'Mr. Paul' substantially as described and illustrated, which is characterized by a vigorous, regular bearing tree and fruit of mild, sweet, pleasant flavor, which most nearly resembles its parent plant Queen Rosa (unpatented) but is distinguished therefrom and an improvement thereon by ripening in late July, approximately a month later than Queen Rosa, and by a more attractive skin coloration, being darker color overall and having a band of purple coloration along the suture at full maturity.

5,414

CHRYSANTHEMUM PLANT NAMED FOXY

William E. Duffett, Salinas, Calif., assignor to Yoder Brothers, Inc., Barberton, Ohio

Filed Jun. 16, 1983, Ser. No. 505,086

Int. Cl.[3] A01H *5/00*

U.S. Cl. Plt.—74 **1 Claim**

1. A new and distinct plant of *Chrysanthemum morifolium,* Ramat., named Foxy, as described and illustrated, and particularly characterized as to uniqueness by the combined characteristics of flat capitulum form; daisy capitulum type; red ray floret color; diameter across face of capitulum ranging from 85 to 100 mm. at maturity; uniform late nine week flowering response; tall plant height when grown single stem; 12 to 18 cm. peduncles on open, normally terminal sprays; very slow development of yellow green discs; and 13° C. minimum temperature tolerance for initiation and development of flowering buds with no less than 14 continuous dark hours.

5,415

ROSE PLANT

F. Harmon Saville, Rowley, Mass., assignor to Nor'East Miniature Roses, Inc., Rowley, Mass.

Filed Nov. 30, 1983, Ser. No. 556,269

Int. Cl.[3] A01H *5/00*

U.S. Cl. Plt.—10 **1 Claim**

1. A new and distinct variety of rose plant of the miniature rose class, substantially as shown and described, characterized particularly by bright orange red flowers of good exhibition form and substance with petals reflexing and rolling under upon opening while retaining good form.

5,416

PLUM TREE, "MIDROSAS"

John D. Pakchoian, Fresno, Calif., assignor to Pakchoian Farms, Fresno, Calif.

Filed Oct. 17, 1983, Ser. No. 542,446

Int. Cl.[3] A01H *5/03*

U.S. Cl. Plt.—38 **1 Claim**

1. A new and distinct variety of plum tree substantially as illustrated and described which is characterized by its similarity to the Late Santa Rosa (unpatented), which it most nearly resembles and from which it is distinguished by bearing fruit which ripens 5 or 6 weeks earlier and by the absence of a dark-colored band along the suture, which is characteristic of the Late Santa Rosa.

5,417

AFRICAN VIOLET PLANT NAMED MONIQUE

Reinhold Holtkamp, Isselburg, Fed. Rep. of Germany, assignor to Gesellschaftsvertrag uber die Erfindergemeinschaft "Optimara", Rees Haffen, Fed. Rep. of Germany

Filed Mar. 22, 1983, Ser. No. 477,689

Int. Cl.[3] A01H *5/00*

U.S. Cl. Plt.—69 **1 Claim**

1. A new and distinct variety of African violet plant named Monique, as described and illustrated, having early and profuse flowering, upright flower stems each carrying 7–10 or more lilac colored flowers, flexible peduncle and green, attractive leaves.

PATENTS

GRANTED MAR. 12, 1985

ERRATA

For CLASS	See PATENT NO.
051–284	4,503,613
446–046	4,503,635
098–002	4,503,749
414–225	4,503,798
384–543	4,504,099
534–742	4,504,416
514–011	4,504,469
514–019	4,504,470
514–018	4,504,471
514–036	4,504,472
514–078	4,504,474
514–413	4,504,475
514–211	4,504,476
514–203	4,504,477
514–202	4,504,478
514–252	4,504,479
514–214	4,504,480
514–255	4,504,481
514–275	4,504,482
514–351	4,504,483
514–357	4,504,484
514–192	4,504,485
514–380	4,504,486
514–492	4,504,487
514–493	4,504,488
514–493	4,504,489
514–483	4,504,490
514–521	4,504,491
514–522	4,504,492
514–738	4,504,493
514–544	4,504,494
514–760	4,504,495
264–200	4,504,901

PATENTS

GRANTED MARCH 12, 1985

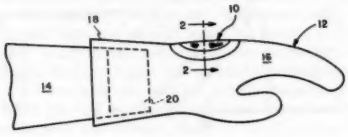
GENERAL AND MECHANICAL

4,503,565

MEMBRANE VALVE FOR DRY DIVER'S APPAREL

Maxwell W. Lippitt, Jr., and Marshall L. Nuckols, both of Panama City, Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 17, 1983, Ser. No. 467,428
Int. Cl.³ B63C *11/08, 11/02*
U.S. Cl. 2—2.1 R **13 Claims**



1. A vent device in combination with an article of diver's dry suit apparel including a shell of waterproof fabric, said device comprising:

a vent control element comprising a water impervious, microporous membrane of expanded, hydrophobic, synthetic material;

means for securing said vent control element in obturating relation to a vent opening in said shell; and

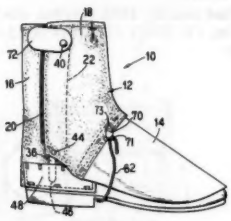
said vent control element being operative to prevent ambient water from entering said article through said opening and to permit venting of gas from said article through said opening when the gas pressure within said article exceeds ambient water pressure outside said article.

4,503,566

LEG PROTECTOR

Hudson L. Wheeler, Northfield, Ill., assignor to Wheeler Protective Apparel, Inc., Chicago, Ill.

Filed Oct. 28, 1983, Ser. No. 546,560
Int. Cl.³ A41D *17/00*
U.S. Cl. 2—22 **8 Claims**



1. A leg covering comprising:

first and second upper parts,

and a flare part,

said flare part comprising a sheet-form member made of heat-resistant material and shaped in development to have a first generally circular edge and a second edge of shallower curvature,

said first and second upper parts each comprising a sheet-form member of heat-resistant material and being of irregular rectangular configuration and having curved edge portions complementary to said second edge of said flare,

fastening means for pemanently connecting said curved edge portions to said first and second upper parts to said second edge of said flare part, and connecting adjacent inner overlapping vertical edges of said upper parts to one another,

one of said upper parts carrying a metal stay extending generally vertically adjacent an outer edge of said one part and projecting below a relieved lower edge portion of said one part for capture and retention of said projecting portion of said stay in a pocket formed in a lower portion of the other of said upper parts and aligned to register with said projecting portion of said stay when the two upper parts are wrapped around the leg of a user,

hook and pile fastening means extending along vertical opposite edges of said upper parts and being of sufficient width to afford circumferential adjustability relative to the leg of a user,

fastening means connected to said leg covering extending beneath the shoe of the user and having selectively engageable detent means to lock the flare portion over the instep and toes of the user,

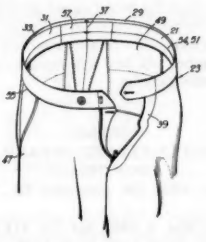
and a tab with a manually engageable portion near the top of one of said upper parts to facilitate detachment of said hook and pile fastening means for easy removal of the leg protector.

4,503,567

PARTIALLY STIFFENED EXTENSIBLE WAISTBAND STRUCTURE

Ralph F. Muse, Bremen, Ga., assignor to Hubbard Company, Bremen, Ga.

Filed Nov. 28, 1983, Ser. No. 555,467
Int. Cl.³ A41F *9/02*
U.S. Cl. 2—237 **16 Claims**



1. A garment waistband structure comprising:

(a) an elastic band comprising:

(i) a plurality of stiffened fibers oriented laterally across the band;

(ii) a plurality of elastic threads oriented longitudinally through the band;

(iii) a plurality of fibers oriented longitudinally which bind the stiffened fibers to the elastic threads and which loosely interconnect the stiffened fibers;

(b) a partially extensible fabric web partially covering the elastic band comprising:

(i) an outer web portion; and

(ii) an inner web portion;

(c) a first securing means securing upper linear parts of the outer web portion and the inner web portion to upper linear parts of the inner surface of the elastic band;

(d) a second securing means securing lower linear parts of the outer web portion and middle linear parts of the inner web portion to the elastic band; and

(e) a third securing means securing lower linear parts of the

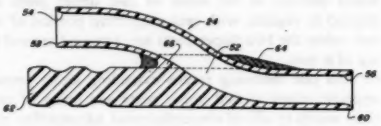
inner web portion to lower linear parts of the outer surface of the elastic band.

4,503,568

SMALL DIAMETER VASCULAR BYPASS AND METHOD

Peter N. Madras, Newton, Mass., assignor to New England Deaconess Hospital, Boston, Mass.

Filed Nov. 25, 1981, Ser. No. 325,057
Int. Cl.³ A61F *1/00*; A61B *17/04*
U.S. Cl. 3—1.4 **8 Claims**



1. A non-absorbable prosthetic arterial connector for coupling an arterial graft to a small diameter blood vessel having an arteriotomy, said vessel having a diameter D at said arteriotomy, comprising:

a tubular entrance member adapted for receiving, and providing a passage for, blood from a prosthetic blood vessel,

a tubular exit member being coupled to said entrance member and adapted for receiving and providing a passage for blood from said entrance member, the downstream end of said exit member passage being angularly offset from the downstream end of said entrance member passage, said exit member downstream end being adapted for insertion through said artiotomy and into the portion of said vessel downstream of said artiotomy, said exit member downstream end having an outer diameter D, and

a heel member extending substantially coaxially from the end of said exit member opposite said exit member downstream end, said heel member having a distal end adapted for insertion through said arteriotomy and into the portion of said small diameter blood vessel upstream of said arteriotomy,

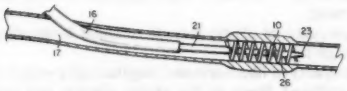
wherein the central axes of the upstream portion of said entrance member and said exit member downstream end are substantially parallel.

4,503,569

TRANSLUMINALLY PLACED EXPANDABLE GRAFT PROSTHESIS

Charles T. Dotter, 4004 SW. Greenleaf Dr., Portland, Oreg. 97221

Filed Mar. 3, 1983, Ser. No. 471,856
Int. Cl.³ A61F *1/00, 1/24*; A61B *17/00*
U.S. Cl. 3—1.4 **14 Claims**



7. A graft prosthesis for placement within a body passageway comprising:

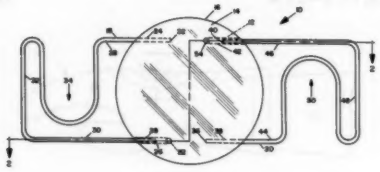
an elongate member having first and second open ends and a lumen therethrough, said member expandable from a first position wherein said member is sized for transluminal placement within said body passageway to a second position wherein said member is larger than said body passageway, said member expanding in response to an increase in temperature such that after placement within said body passageway and upon heating of said member to a temperature equal to or in excess of normal body temperature said member expands radially so as to become firmly anchored in said body passageway, expansion of said member also causing expansion of the diameter of said lumen.

4,503,570

INTRAOCULAR LENS

Dennis T. Grendahl, 150 Pennisula Rd., Medicine Lake, Minn. 55441

Filed Jul. 15, 1982, Ser. No. 398,322
Int. Cl.³ A61F *1/16, 1/24*
U.S. Cl. 3—13 **5 Claims**



1. Intraocular lens for implant in an eye, said lens comprising:

a. plano-convex lens including a plano surface, a convex surface, and a finite edge surface about a junction between said plano surface and said convex surface;

b. plurality of closed loops for supporting said lens in said eye, said loops including two ends, one of said ends secured to said edge surface of said lens;

c. hole means for slidable engagement positioned in said lens and supporting each other end of said loop, whereby each of said loops is inherently adjustable in the eye thereby providing an all-size lens; and,

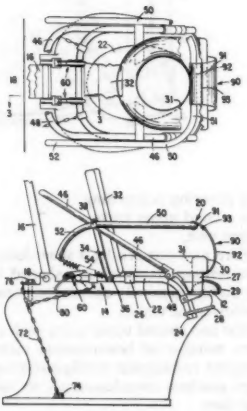
d. pressure relieving means in said lens between said hole means and at a substantially right angle to a surface of said lens.

4,503,571

INFANT TRAINER SEAT

James T. Sidney, 1105 Wentworth Ave., Box 864, Chicago Heights, Ill. 60411

Filed Jan. 21, 1983, Ser. No. 459,798
Int. Cl.³ E03D *11/00*; A47K *13/00*
U.S. Cl. 4—254 **1 Claim**



1. An infant trainer seat for releasable mounting to a standard commode or toilet seat, said trainer seat comprising:

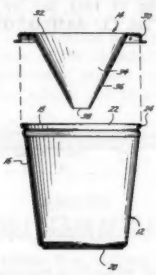
a. a support frame system adapted to rest on a standard seat, span the opening in the toilet seat and releasably grasp the toilet seat;
b. a trainer seat portion which defines a child-receiving opening secured to said frame and positioned on said frame to be aligned with the opening in said standard seat;
c. a collapsible backrest system which includes (1) a backrest portion that is movable between a raised substantially upright position and a collapsed co-planar position; and (ii) backrest frame means pivotally connected to said support frame and backrest, for positioning and securing the backrest in either the upright or co-planar positions;
d. armrest and infant-restraining frame means pivotally connected to said backrest frame means for movement from a substantially upright position aligned with the backrest to a substantially horizontal child-restraining position aligned with the support frame but spaced therefrom;
e. said backrest frame means further including overcenter toggle linkage means for pivotally connecting said support frame and said backrest which is in a closed position when the seat is upright and in an opened position when collapsed, and tubular means pivotally connected at one end to the support frame adjacent the forward end of the infant seat and pivotally connected to the toggle linkage adjacent the backrest;
f. spring-biasing means are provided for biasing the armrest frame means to the upright position, said biasing means comprising a tension spring connecting the rearward and lower ends of the armrest frame means and the support frame means; and
g. latch means operatively associated with said support frame system are provided for latchably and releasably connecting said trainer seat to said standard seat.

4,503,572

DISPOSABLE RECEPTACLE FOR SPITTLE

Patricia S. Dawson, Texhoma, Tex., assignor to Spit Pit, Inc., Texhoma, Tex.

Filed Sep. 17, 1982, Ser. No. 419,817
Int. Cl.³ A61J *19/00*
U.S. Cl. 4—258 **6 Claims**



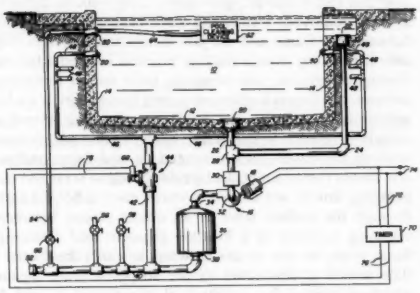
1. A disposable apparatus for disposal of spittle, comprising:
(a) a receptacle having a top and a base and a known distance between the top and the base, the receptacle being shaped in a truncated conical configuration slightly tapered inwardly from the top to the base and open at the top, the receptacle further including a lip disposed around the top having a known outer diameter; and
(b) a lid comprising:
(i) a generally disk-shaped member having an aperture of selected diameter disposed therethrough, the disk-shaped member having an outer diameter approximately equal to the outer diameter of the lip;
(ii) a channel member connected transverse to the disk-shaped member around the perimeter of the disk-shaped member such that the channel member extends on one side of the disk-shaped member, the channel member being comprised of an elastic material and being shaped to form a mating recess to snuggly receive and mate with such a lip of such a receptacle when the lid is attached to the receptacle, the channel member being further adapted such that the channel member expands outwardly to allow passage of such a lip of a receptacle into the channel when the lid is being attached to the receptacle and substantially returns to shape once such a lip is in place in the channel to form a substantially fluid-tight seal; and
(iii) a hollow truncated conical section having a first open end of inner diameter substantially equal to the diameter of the aperture of the disk-shaped member and a second open end of inner diameter less than the diameter of the first open end, whereby the conical section has a tapered bore extending therethrough, the first open end of the conical section being secured to the disk-shaped member such that the bore aligned with the aperture and such that the conical section extends transversely from the disk-shaped member on the same side of the disk-shaped member as the channel member, the conical section further having a length of one-half to three-fourths of the distance from the top to the base.

4,503,573

SWIMMING POOL WATER CIRCULATION SYSTEM

James M. Handzel, 4439 W. Charter Oak, Glendale, Ariz. 85304

Filed Jul. 11, 1983, Ser. No. 512,425
Int. Cl.³ E04H *3/16, 3/18*
U.S. Cl. 4—507 **16 Claims**

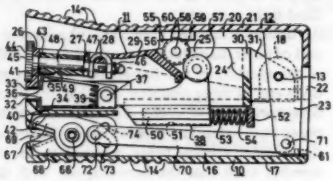


1. A water circulation system for a swimming pool of the type having an associated water operated cleaning means for cleaning the interior surfaces of the pool, said water circulation system comprising:
(a) pump means for withdrawing water to be filtered from the swimming pool;
(b) filter means coupled to receive the water to be filtered from the pump means;
(c) a filtered water return plumbing means connected to receive the filtered water from said filter means for returning the filtered water to the swimming pool at a relatively low pressure high volume flow rate;
(d) a two-state valve means in said return plumbing means with the first state being an open state for allowing the flow of filtered water through said return plumbing means with the second state being a closed state for stopping the flow of filtered water therethrough; and
(e) a diversion conduit coupled to said return plumbing means between said filter means and said two-state valve means for directing the flow of filtered water to the cleaning means associated with the swimming pool at a relatively high pressure low volume flow rate when said two-state valve means is in its closed state.

4,503,574
COMBINATION WIRE STRIPPING AND CUTTING TOOL

Mats Norin, and Lars-Olov Persson, both of Älvdalen, Sweden, assignors to Pressmaster Tool AB, Alvadel, Sweden

Filed Jul. 15, 1983, Ser. No. 514,047
Claims priority, application Sweden, Jul. 19, 1982, 8204396
Int. Cl.³ B25F *1/00*; H02G *1/12*
U.S. Cl. 7—107 **12 Claims**



1. A tool for stripping surface layers from elongate objects, including an elongate frame; a jaw means which extends along the frame and which is pivotally connected thereto; a leg which also extends along said frame and which is pivotally mounted in said frame so that when the leg is pivoted towards the frame said leg swings the jaw means towards the frame, via a camming arrangement and against the action of a restoring means, the frame and the jaw means having, at one end of the tool, mutually facing clamping surfaces arranged, when the jaw means is pivoted towards the frame, to firmly clamp an elongate object placed between said clamping surfaces adjacent that end of said elongate object from which a surface layer is to be removed; a stripping knife means which is arranged between the frame and the jaw means and which is displaceable therealong from a starting position located adjacent said clamping surfaces, said stripping knife means including two carriers, one for each of two stripping knives which are located substantially opposite one another and which extend transversely in relation to said frame, each of said carriers co-acting with an associated guide arranged on said frame and on said jaw means respectively, said guides being so arranged that the stripping knives are moved towards each other, so as to cut through the surface layer of an object placed between said clamping surfaces, at a location adjacent said clamping surfaces, when the jaw means is swung towards the frame; and a slide which is connected to the stripping knife means and which is guided for longitudinal movement in said frame, which slide is arranged to be acted upon by said leg, via said camming arrangement in a manner such that when said leg is swung towards the frame, subsequent to the clamping surfaces and the stripping knives having been brought together, the knife means is moved away from said starting position against the action of said restoring means, wherein said leg extends from the position at which it is connected to the frame to permit said pivoting of the leg, substantially to the region of that part of the jaw means which is provided with a clamping surface, adjacent said one end of the tool, and covers at least the upper side of the jaw means remote from said frame.

4,503,575
AUTOMATIC LIQUID CONTROL SYSTEM FOR A CLOTHES WASHING MACHINE

Donald E. Knoop, Royalton Township, Berrien County, and David W. Mundy, St. Joseph Township, Berrien County, both of Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Dec. 2, 1982, Ser. No. 446,225
Int. Cl.³ D06F *33/02, 39/02, 39/08*
U.S. Cl. 8—158 **29 Claims**

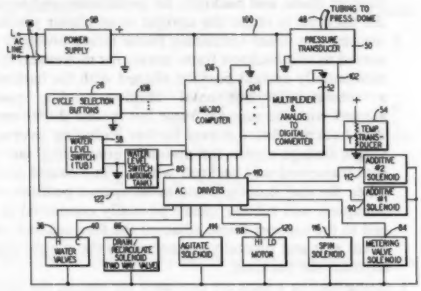
1. An automatic washing machine having a tub to receive washing liquid and a load of clothes to be washed therein including an automatic liquid fill control system comprising:

supply means for supplying washing liquid to said tub,

means for continuously determining an incremental input volume of liquid to be supplied to said tub,

means for adding succeeding incremental volumes of liquid to said tub to achieve an optimum total volume,

means for determining when an initial liquid depth has been achieved within said tub,



means for calculating the volume of liquid absorbed by said clothes load when said initial depth of liquid has been achieved,

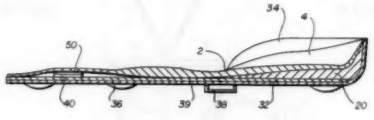
means for determing the optimum total volume of liquid required for washing said clothes load from said absorbed volume at said initial depth, and

means for automatically controlling said supply means for admitting desired volumes of water into said tub.

4,503,576
ORTHOTIC APPLIANCE AND METHOD OF MAKING

Dennis N. Brown, 1091 Fir Ave., Blaine, Wash. 98230

Filed Aug. 19, 1981, Ser. No. 294,306
Int. Cl.³ A43D *00/00*
U.S. Cl. 12—146 M **18 Claims**



1. A method of forming an orthotic appliance comprising the steps of:

forming an insert of expandible material,

heating and expanding the insert until it is dimensioned larger than when cool,

providing a support platform with an open top area for access to a top of a foot,

placing the insert on the support platform,

affixing the platform to a foot to be fitted,

covering the foot in an air tight bag,

inserting a vacuum conduit into the bag,

securing the bag in an air tight relation about the foot,

orienting the mid-tarsal of the foot for correct alignment in a neutral non-flexed position,

applying the vacuum whereby the insert is drawn tightly against the foot, being conformed thereto,

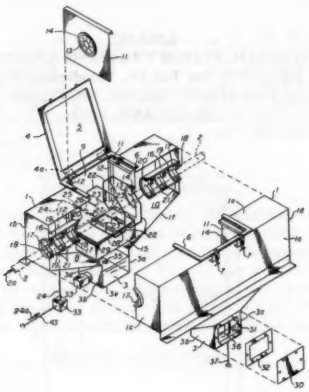
and cooling the insert to allow it to set up whereby the insert defines the appliance.

4,503,577

PIPE AND HOSE DECONTAMINATION APPARATUS

David E. Fowler, Gainesville, Fla., assignor to Quadrex HPS, Inc., Gainesville, Fla.

Filed Jun. 14, 1982, Ser. No. 388,492
Int. Cl.³ B08B 9/02
U.S. Cl. 15—88 **25 Claims**



1. A decontamination apparatus for removing radioactive contamination from a work piece comprising:

a chamber having an entrance end and an exit end to accomodate a work piece through the chamber with the chamber further having a sloping bottom;

a solvent holding tank connected to the sloping bottom of said chamber and openly communicating with the interior of said chamber;

a first cylindrical housing mounted in the entrance end and extending into the interior of said chamber for supporting and guiding the work piece as it enters the chamber;

a second cylindrical housing mounted in the exit end and extending into the interior of said chamber for supporting the work piece as it exits the said chamber;

means for spraying solvent on the work piece as it progresses through the interior of the chamber with said spraying solvent means positioned around the periphery of the work piece so that solvent will be evenly distributed on the work piece;

means for circulating the solvent in a continuous loop through the spraying means.

4,503,578

BRUSH ASSEMBLY APPARATUS FOR CLEANING CANNONS

Donald J. McIntyre, Dallas, Tex., assignor to San/Bar Corporation, Trvine, Calif.

Filed Jun. 28, 1982, Ser. No. 392,567
Int. Cl.³ B08B 9/02
U.S. Cl. 15—104.165 **2 Claims**

1. A brush assembly for cleaning the bore of a cannon comprising:

a cylindrically-shaped brush comprised of an elongated brush element of nylon bristles held in a steel channel strip, said strip wound in the form of a spiral;

a forward plate having a flange thereon facing towards a rear plate for supporting said brush;

a rear plate having a flange thereon facing toward the forward plate for supporting said brush;

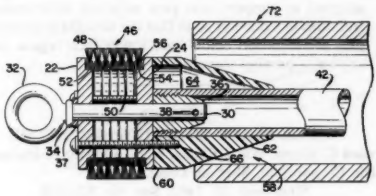
a plurality of screws extending through said forward and rear plates for squeezing the spirally wound brush element together between said forward and rear plates;

a center shaft coupled to said forward and rear plates, said shaft being positioned coaxial with respect to said brush and extending beyond the rear plate;

a threaded collar coupled to said center shaft, said collar being disposed over the center shaft extending beyond said rear plate adjacent said rear plate and fastened to said center shaft;

a running shaft threadably secured over said collar and adjacent said rear plate;

a centering element of high density plastic disposed over said collar and said running shaft adjacent said rear plate, said centering element having an opening for receiving a



running shaft and an inclined surface generally extending from the outer periphery of said rear plate to said opening, said centering element being held fast to said rear plate by said plurality of screw;

an eyelet positioned adjacent said foward plate as an integral part of said center shaft; and

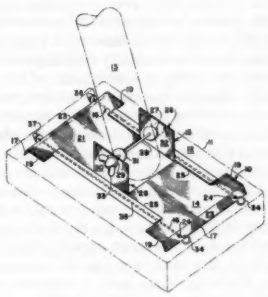
a cylindrically-shaped shim disposed between said forward and rear plates and said brush supported by said forward and rear plate flanges for lengthening the bristle extensions of the brush further beyond the forward and rear plate diameter.

4,503,579

SPONGE-HOLDING DEVICE

Garland L. Nicely, 1702 Hollandale Rd., Richmond, Va. 23233

Continuation-in-part of Ser. No. 488,220, Apr. 25, 1983, abandoned. This application May 8, 1984, Ser. No. 608,180
Int. Cl.³ A47L 13/257
U.S. Cl. 15—244 A **3 Claims**



1. An improved device for holding a sponge having a flat upper surface comprising:

(a) a base plate of generally rectangular periphery having two opposed parallel end edges equidistantly disposed about a lateral plane of symmetry that perpendicularly bisects said base plate, opposed parallel side edges equidistantly disposed about a longitudinal plane of symmetry that perpendicularly bisects said base plate at a right angle to said lateral plane of symmetry, flat upper and lower face regions, and a border zone adjacent each end edge and angled downwardly toward said lower face region,

(b) mounting means centrally positioned upon said upper face region and adapted to pivotably engage the extremity of an elongated handle,

(c) a pair of holding pins having straight portions adapted to be disposed in generally parallel relationship to said longitudinal plane of symmetry, each pin having a head extremity and a pointed extremity capable of penetrating a sponge,

(d) first support means adapted to support the head extremities of said pins in a location below said lower face region, and comprising apertures associated with said border zones, and

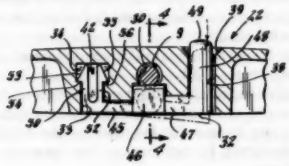
(e) second support means, associated with said base plate and adapted to support said pins adjacent their pointed extremities in a manner such that the straight portions of said pins are disposed below said lower face region and substantially parallel thereto.

4,503,580

WIPER BLADE COUPLING STRUCTURE

Bernard C. Sharp, White Plains, N.Y., assignor to Parker-Hannifin Corporation, Shelton, Conn.

Filed Aug. 26, 1983, Ser. No. 526,599
Int. Cl.³ B60S 1/40
U.S. Cl. 15—250.32 **3 Claims**



1. A windshield wiper blade holder including a primary yoke having means on a central portion thereof for coupling it with a windshield wiper arm;

said central portion being quite rigid;

said coupling means comprising a socket extending transversely through said central portion to receive slidably the side pin of a wiper arm end of the side mounting type, an elongate recess formed in and along the under side of said central portion, said recess comprising a pocket inside said central portion to one side of said socket and a cavity extending across said socket, and a resilient elongate latch member formed as a unitary molding of a tough polymeric material and fitting in said recess;

said latch member comprising anchor means on an end thereof extending into and engaging with a wall of said pocket to anchor the latch member in place and an abutment portion which is normally seated in said cavity, is displaceable elastically by said side pin pressed into said socket and is reseatable by the resilience of said latch member to engage in a groove of said side pin; said latch member further comprising a protruding portion movable to displace said abutmen: portion elastically out of said groove to free said side pin for removal of the blade holder from the wiper arm, a resilient arm portion connecting said abutment portion with said anchor means and a rigid arm portion connecting said abutment portion with said protruding portion so that by downward pressure on said protruding portion said resilient arm portion is elastically deflectable downward with displacement of said abutment portion from said cavity;

said pocket comprising a mouth portion leading into a wider chamber thereover;

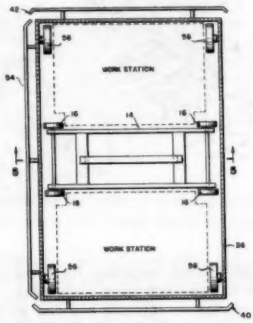
said anchor means comprising resilient upward protrusions spaced apart on said latch member end and formed at their outer sides with end surfaces sloped toward ledges thereunder, said protrusions being convergeable elastically by forced movement of said sloped end surfaces into said mouth portion and being anchored in said chamber by engagement of said ledges against a wall of said chamber bordering said mouth portion.

4,503,581

AUTOMATIC FLOOR TREATING APPARATUS

Susan E. Early, 2938 Fox Tail Ct., Woodbridge, Va. 22192

Filed Mar. 9, 1983, Ser. No. 473,545
Int. Cl.³ A47L 9/00
U.S. Cl. 15—319 **7 Claims**



1. Apparatus for automatically treating a floor or material on a floor, comprising:

a support frame;

floor treating means carried by said support frame;

a first set of wheels carried by the support frame for moving said apparatus along a first path of movement;

a second set of wheels movably supported on the apparatus for movement toward and away from the floor, and oriented to move the apparatus along a second path of movement at a right angle to the first path;

elevating means for moving the second set of wheels upwardly and downwardly relative to the floor to alternately engage and disengage the first and second sets of wheels with the floor to cause the apparatus to alternately move along the first and second paths of movement;

first motor means for driving the first set of wheels;

second motor means for driving the second set of wheels and the elevating means; and

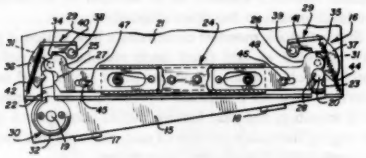
control means for controlling operation of said first and second motor means and said elevating means, including sensor means at opposite ends and at one side of the apparatus for sensing an obstruction, said control means being operative upon sensing an obstruction at either end of the apparatus, when the first set of wheels are in contact with the floor and the apparatus is moving along said first path of movement, to turn on said second motor means and turn off said first motor means, said second motor means being operatively connected to operate said elevating means to move said second set of wheels into contact with the floor to lift the support frame and first set of wheels from the floor and to drive the second set of wheels to move the apparatus along the second path of movement for a predetermined time, said control means being operative at the end of said predetermined time to elevate said second set of wheels and enable said first set of wheels to contact the floor, and to turn off said second motor means and turn on said first motor means to once again cause said apparatus to move along said first path of movement.

4,503,582

DOUBLE-ACTING REFRIGERATOR DOOR HINGE AND SLIDING LOCK-BOLT

Vincent P. Gurubatham, Berrien County, Mich., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Sep. 29, 1982, Ser. No. 427,111
Int. Cl.[3] E05D 15/50
U.S. Cl. 16—232 13 Claims



1. For use in a housing structure having a cabinet having an access opening defining opposite sides, and a door for selectively closing said opening, said door defining opposite sides, hinge means for mounting the door to the cabinet with the opposite sides of the door juxtaposed respectively to the opposite sides of the access opening and permitting the door to be opened from either side of the opening, said hinge means comprising:

a pair of pivot pins on the door one each at the opposite sides of the door;

means defining a pair of pivot recesses on the cabinet one each at said opposite sides of the opening for removably receiving said pivot pins;

a slide bar selectively reciprocably longitudinally movable on the cabinet and having opposite ends defining catches for releasably retaining the pivot pins, said catches and slide bar being constructed to prevent concurrent movement of both pivot pins outwardly from said pivot recesses; and

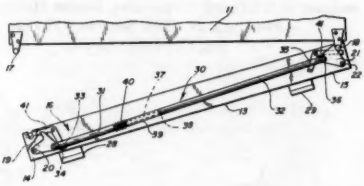
a pair of locking means one each at said opposite ends of the slide bar responsive to opening movement of the door from either side effecting withdrawal of the pivot pin thereat from its associatcd recess for effectively longitudinally moving said slide bar to and locking the slide bar in a thrown position preventing withdrawal of the other pivot pin from its associated recess, each said locking means comprising a retainer pivotally mounted to the cabinet and defining a shoulder facing toward the adjacent end of the slide bar, means on the slide bar end facng toward the retainer shoulder, biasing means for biasing the retainer to urge the retainer shoulder into the path of movement of the slide bar shoulder, first cam means on said retainer for engagement by the associated pivot pin as the pivot pin is moved into the associated pivot recess to urge the retainer pivotally to move the retainer shoulder out of the path of movement of the slide bar shoulder permitting the slide bar to move longitudinally sufficiently to cause the catch at that end to engage the pivot pin in the pivot recess to retain the door edge thereat pivotally mounted to the adjacent cabinet side, the slide bar end further defining a second cam means for engagement by the pivot pin as an incident of the side of the door being urged away from the adjacent side of the cabinet with the locking means at the opposite end of the slide bar locking the pivot pin on the opposite side of the door pivotally to the opposite side of the cabinet to urge the slide bar longitudinally toward said opposite side of the cabinet and permit the retainer to be pivoted by the biasing means to urge the retainer shoulder into the path of movement of the adjacent slide bar shoulder to prevent longitudinal movement of the slide bar away from said opposite side of the door thereby effectively positively locking the slide bar in the thrown position as long as the pivot pin withdrawn from the pivot means remains withdrawn; and cooperating safety lock means on said door and slide bar for positively preventing withdrawal movement of said other pivot pin while said slide bar is in said thrown position.

4,503,583

ENCLOSURE WITH DOUBLE ACTING HINGE MECHANISM HAVING OVERCENTER LATCH

Edwin H. Frohbieter, Lincoln Township, Berrien County, Mich., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Sep. 29, 1982, Ser. No. 427,113
Int. Cl.[3] E05D 15/50
U.S. Cl. 16—232 10 Claims



1. In an enclosure structure having a cabinet defining an access opening, and a door for selectively closing said opening defining opposite sides, improved mounting means for mounting the door to the cabinet for releasably retaining the door in a closed position across the opening and permitting the door to be swung open outwardly from either of said sides to an open position, said improved mounting means comprising:

first hinge pin means fixed to the cabinet at one side of said opening;

second hinge pin means fixed to the cabinet at the opposite side of said opening;

a first latch member pivotally mounted to one side of said door for selective positioning in a latching position in latched association with said first hinge pin means and an open position, said latching and open position being oppositely overcentered relative to a center position;

a second latch member pivotally mounted to the opposite side of said door for selective positioning in a latching position in latched association with said second hinge pin means and an open position, said latching and open positions being oppositely overcentered relative to a center position;

means on said door cooperating with the latch members to form latch means for retaining the hinge pin means in pivotal relationship with the door when the latch members are in said latching position; and

locking means operably associated with each of said latch member for effectively maintaining either latch member in said latching position in latched enclosing association with its associated said hinge pin means as an incident of positioning of the other of said latch members in the open position thereof, thereby preventing the door from becoming completely unhinged from the cabinet, said locking means comprising a resiliently extensible and contractible rod having one end pivotally connected to said first latch member and an opposite second end pivotally connected to the other latch member, said rod biasing said latch members to said overcentered positions, and a pair of lever means movably mounted on said door and associated one each with the opposite ends of the rod, each lever means having a first portion engageable with the rod end and a second portion disposed in the path of movement of the hinge pin means to cause said first portion to move the rod and thereby pivot the latch member relative to both the rod and the door into the latching position as an incident of the hinge pin means being moved into latching association with the associated said latch member and into concurrent engagement with said lever means second portion, each said latch member being pivoted to the

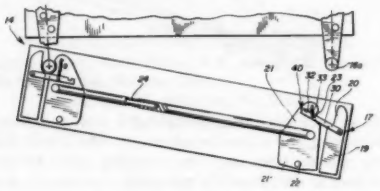
overcenter open position thereof as an incident of the associated said hinge pin means being withdrawn from the latch means, said rod positively retaining the opposite latch member in the closed position whenever either latch member is pivoted to the open position as a result of said hinge pin means.

4,503,584

ENCLOSURE STRUCTURE WITH DOUBLE-ACTING HINGE MECHANISM HAVING INTERLOCKING PIVOTAL LATCH

Gregory L. Malchow, Lincoln Township, Berrien County, Mich., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Sep. 29, 1982, Ser. No. 427,112
Int. Cl.³ E05D *15/50*
U.S. Cl. 16—232 **3 Claims**



1. In an enclosure structure having a cabinet defining an access opening and a door for selectively closing said opening, said door defining opposite sides, improved mounting means for mounting the door to the cabinet for releasably retaining the door in a closed position across the opening and permitting the door to be swung open outwardly from either of said sides to an open position, said improved mounting means comprising:

a first hinge pin fixed to the cabinet at one side of the opening;

a second hinge pin fixed to the cabinet at the opposite side of the opening;

first latch means on one side of the door releasably embracing said first hinge pin in a closed disposition thereof to define a first pivotal connection of the door to the cabinet;

second latch means on the opposite side of the door releasably embracing said second hinge pin in a closed disposition thereof to define a second, opposite pivotal connection of the door to the cabinet, each of said latch means including an inboard latch member movably mounted to the door for selective disposition in a closed disposition whereby said latch means is in said closed disposition thereof, and an open disposition;

a resiliently extensible and contractible connecting rod connected between said movable latch member of said first and second latch means and having a minimum contracted length preselected to prevent movement of either one of said movable latch members from the closed disposition to the open disposition thereof, as by pivotally swinging the door away from the cabinet about one of said hinge pins to cause the other of said hinge pins to be effectively withdrawn from its associated said latch means, the movable latch members having camming surfaces engaged by the hinge pins for urging the movable latch members from the closed disposition thereof to the open disposition thereof as an incident of such withdrawal; and

interlock means for maintaining the latch members in the open disposition thereof when urged thereto by the withdrawn hinge pin thereby maintaining said connecting rod in the minimum contracted length disposition as an incident of movement of either of said latch means to the open disposition and releasing the latch member to be urged to said closed disposition as an incident of the hinge pin being effectively returned into engagement with the latch means;

each said interlock means comprises interlocking elements mounted on the latch means for retaining either latch member in the open disposition thereof when the door is swung open to displace the latch member from engagement with its associated said hinge pin, said interlock means comprising a first interlock element movably mounted on the door and a second interlock member on the movable latch member, and means biasing the first interlock member into interlocking engagement with the second interlock member as as incident of movement of the latch means to the open disposition;

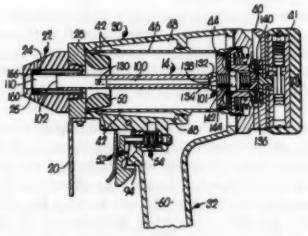
said first interlock member comprises a link which is pivotally mounted to said fixed latch member and defines a notch which is spaced from its pivot point, said second interlock member comprises a projection on the movable latch member, and said biasing means comprises a spring for urging the notch portion of said movable link and said projection into interlocked association.

4,503,585

PNEUMATIC STUNNER

Jerome T. Hamel, Shawnee, and Bernard G. Huff, Shawnee Mission, both of Kans., assignors to Hantover, Inc., Kansas City, Mo.

Filed Apr. 14, 1983, Ser. No. 484,938
Int. Cl.³ A22B *3/02*
U.S. Cl. 17—1 B **5 Claims**



1. A stunner, comprising;

a housing having an engagement surface;

a stunning element;

means shiftably mounting said stunning element within said housing, including means for projecting one end of said element from said housing for stunning an animal;

selectively shiftable trigger means;

means operatively coupling said trigger means and element projecting means for operating the latter upon shifting of said trigger means, said coupling means including an operating member normally spaced from said trigger means;

selectively actuatable safety means for preventing inadvertent actuation of said coupling means by preventing shifting of said trigger means, said safety means including

a safety block having a member-engaging portion and a locking portion;

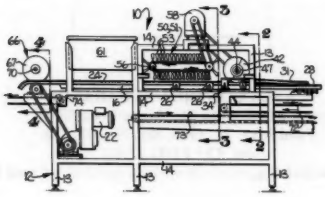
means mounting said block generally between said trigger means and operating member for simultaneous shifting of said block and trigger, and for selective movement of the block between an operating position wherein, upon said shifting of said trigger means, said block portion shifts with said trigger means and engages said operating member to operate said coupling means, and a safety position wherein said locking portion of the block is adjacent said engagement surface of said housing, such that upon said shifting of said trigger means said locking portion engages said engagement surface to prevent operation of said coupling means.

4,503,586

APPARATUS AND METHOD FOR PROCESSING CRABS

W. Lee Lockerby, 111 Hudlow Rd., Forest City, N.C. 28043, and Alfred R. Guglielmo, 650 N. Ardenwood - Bldg. #5, Baton Rouge, La. 70806

Filed Jan. 21, 1983, Ser. No. 459,991
Int. Cl.³ A22C 29/02
U.S. Cl. 17—48 19 Claims



1. An apparatus for processing crab bodies which have had their back shells removed, and comprising

crab advancing means for advancing crab bodies serially along a path of travel and including support means extending along the path of travel, conveyor means disposed along the path of travel and adjacent said support means, means for moving the conveyor means along the path of travel, and a plurality of retainers mounted in spaced relation to said conveyor means, with each retainer including forwardly directed arm means adapted for physically engaging a crab body along a line extending parallel to the direction of movement and longitudinally through the central cavity of the crab body, and for clampingly pressing the crab body along such line against said support means to maintain the orientation of the crab body during such advancing movement,

trimming means disposed along the path of travel for severing the claws and legs of the advancing crab bodies,

cleaning means disposed along the path of travel for removing the gills and other inedible materials from the advancing crab bodies, and

slicer means disposed along the path of travel downstream of said trimming and said cleaning means for cutting the crab bodies longitudinally into two half sections.

15. A method of processing crabs to facilitate the removal of the meat, and comprising the steps of

removing the back shell from each crab,

serially advancing each resulting crab body along a predetermined path of travel, with the longitudinal centerline of each crab body being aligned with the direction of movement, and while physically engaging each crab body along a line extending longitudinally through the central cavity of the body and clampingly pressing the crab body along such line against a supporting surface to maintain the orientation of the crab body during the advancing movement,

trimming the claws and legs of the advancing crab bodies,

cleaning the advancing crab bodies to remove the gills and other inedible material therefrom, and then

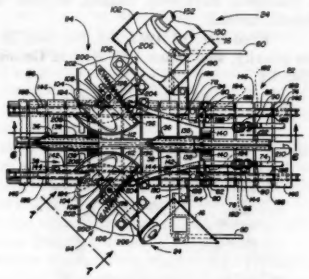
slicing the advancing crab bodies longitudinally into two half sections.

4,503,587

AUTOMATIC POULTRY BREAST PROCESSING MACHINE AND METHOD

Eugene G. Martin, Ephrata, Pa., assignor to Victor F. Weaver Holding Co., Inc., New Holland, Pa.

Filed Dec. 16, 1983, Ser. No. 576,447
The portion of the term of this patent subsequent to Jan. 10, 2001, has been disclaimed.
Int. Cl.³ A22C 21/00
U.S. Cl. 17—52 35 Claims



1. A poultry processing machine for providing button cut removal of a wing from the breast of a poultry carcass section at a shoulder joint connecting the wing to said breast, said machine including:

a. conveyor means for directing the carcass section toward a delivery end of the machine;

b. wing engaging means for extending the wing laterally outwardly from the breast to distend the tissue and tendon materials at the shoulder joint and to impose a shoulder joint dislocating force at a ball-and-socket connection of the shoulder joint;

c. a severing blade assembly comprising:

(1) a blade disposed laterally of the breast adapted to cut the tissue and tendon materials at the shoulder joint;

(2) a shield pivotably mounted for movement in response to movement of the carcass section by the conveyor means toward the delivery end of the machine, said movement of the shield being from a set position laterally between the breast and blade for normally overlying the blade in a position to shield the blade from the breast, to a position overlying said breast and exposing the blade to the distended tissue and tendon materials at the shoulder joint, whereby movement of the carcass section by the conveyor means toward the delivery end of the machine causes close tolerance severing of the distended tissue and tendon materials at the shoulder joint and unobstructed passage between ball-and-socket bone end protuberances of the dislocated ball-and-socket joint.

20. A button cut method of removing at least one whole wing member from a forward bilateral carcass section without either bone fiber contamination or substantial removal of breast meat therewith, said method comprising the steps of: supporting the carcass section through the body cavity thereof with the rearward end of such carcass section directed fowardly and the wing members thereof disposed adjacent opposed bilateral sides thereof; moving the supported carcass section fowardly while simultaneously slidably engaging and laterally distending said at least one wing member for distending tissue and tendon materials at the shoulder joint connecting said at least one wing member to the carcass section preparatory to severing said tissue and tendon materials and for imposing a shoulder joint dislocating force at a ball-and-socket connection of each shoulder joint; protectively shielding the breast section from contact with severing blade means by use of at least one pivotally deflectable blade shield overlying the blade

in a position for overlying the breast; progressively deflecting the blade shield simultaneously with foward movement of the carcass section adjacent the shield for both shielding the breast and exposing the blade means to the distended tissue and tendon materials at the shoulder joint for cutting through said distended tissue and tendon materials and passing unobstructedly through dislocated ball-and-socket joint ends caused by lateral distention of said at least one wing member.

4,503,588

APPARATUS FOR CUTTING FISH HEADS

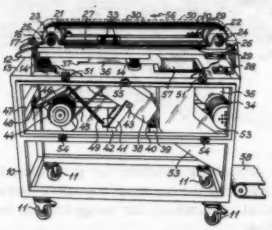
Jón A. Pálmason, Reykjavik, Iceland, assignor to Kvikk s.f., Reukjavik, Iceland

Filed Dec. 10, 1982, Ser. No. 448,725

Claims priority, application Fed. Rep. of Germany, Nov. 26, 1982, 5293/82

Int. Cl.³ A22C *25/18*

U.S. Cl. 17—61 **14 Claims**



1. An apparatus for cutting fish heads into at least two parts, said apparatus comprising;

guide means including an elongated head supporting rail means,

means for consecutively moving the fish heads, which have been threaded onto the head supporting rail means, along said rail means,

gill separating means mounted on the supporting rail means for engaging with the gills of the fish heads being passed along the supporting rail means, so as to separate the gills from the fish heads at least at one end of the gills, and

cutting means extending into the path of movement of the fish heads so as to longitudinally cut the respective fish heads passing the cutting means, whereby more valuable fish head parts may be separated from less valuable head parts.

4,503,589

NEEDLE BAR DRAWING DEVICE

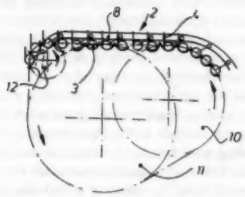
Helmut Kunig, Bad Schwartau, Fed. Rep. of Germany, assignor to S.A. des Ateliers Houget Duesberg Bosson, Ensival, Belgium

Filed Jun. 30, 1983, Ser. No. 509,338

Claims priority, application Fed. Rep. of Germany, Jul. 3, 1982, 3224936

Int. Cl.³ D01G *19/06*

U.S. Cl. 19—129 R **13 Claims**



1. Needle bar drawing device (gill box) for drawing card slivers, said device comprising driven gilling area means including needle bar means running along an endless orbit, defining two ends and carrying needle means, which needle bar means are arranged independently of each other and at least at one of said ends, and include crank means guided in channel cam means, said device further comprising slot guide means for said needle bar means, said slot guide means determining said orbit of said needle bar means during their total run and arranged on each side of said gilling area means, wherein said needle bar means are driven by means of several toothed disc means, said toothed disc means being driven, having at least two peripheries overlapping each other, being arranged offset with respect to each other, and the toothings of which engage said orbit of said needle bar means by positively engaging the same.

4,503,590

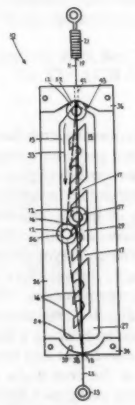
CABLE CONTROL APPARATUS

Leon E. Girard, 516 E. 14th St., Ames, Iowa 50015

Filed Mar. 21, 1983, Ser. No. 477,538

Int. Cl.³ F16G *11/00*

U.S. Cl. 24—114.5 **8 Claims**



1. A cable control apparatus for selectively locking a cable in a plurality of positions, said positions being located substantially axial to said cable, and said apparatus comprising:

(a) a movable cable having a first end that connects to a biasing means for biasing said first end away from said apparatus, and a second end;

(b) control means affixed to said cable; and

(c) a member having:

(i) first track means formed therein for receiving said control means when said control means is urged away from said biasing means;

(ii) second track means formed therein for receiving said control means when said control means is returned to an at rest position;

(iii) a plurality of third track means formed therein that connect with said first track means but not with said second track means for receiving said control means when said control means is locked in other than said at rest position; and

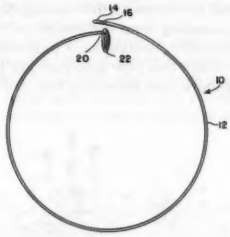
(iv) a plurality of fourth track means formed therein that connect said first track means with said second track means for receiving said control means when moving said control means from said first track means to said second track means, at least one of said fourth track means being positioned between at least two of said third track means.

4,503,591

RING FOR STORING ARTICLES OF CLOTHING

Joanna Adamska-Koperska, 2720 N. Francisco Ave., Chicago, Ill. 60647

Filed May 23, 1983, Ser. No. 497,106
Int. Cl.³ A44B 9/00
U.S. Cl. 24—161 **1 Claim**



1. A ring for holding articles of clothing, and the like, comprising:

a flexible loop portion having a first end and a second end, said first end and said second end being movable toward and away from each other for purposes of locking and unlocking;

a locking member connected to said second end of said loop portion having a passageway in which said first end of said loop portion advances during locking of said first end and said second end together for storing articles of clothing, and the like; said first end of said loop portion being normally spaced from said second end of said loop portion in a lateral direction and elevated above said second end, so that during locking the flexibility of the flexible loop portion provides the necessary locking force to keep said first and second ends locked;

said locking member comprising a flexible clip formed into a spiral shape so that said passageway defines a U-shaped channel along which said first end moves during locking, said U-shaped channel having a first open end directly adjacent to said second end of said loop portion and a second closed end spaced laterally farther from said second end of said loop portion than said first open end, so that, when said first end of said loop portion is forced through said first open end of said U-shaped channel, the natural bias of said loop portion provides a force opposing such movement, and, when said first end of said loop portion is moved along said U-shaped channel until it reaches said second closed end of said U-shaped channel, the natural bias of said loop portion forces said first end of said loop portion against said second closed end of said U-shaped channel, to thereby lock together said first and second ends of said loop portion;

said U-shaped channel comprising a first leg portion having said first open end of said U-shaped channel as its entrance, and a second connecting end; and a second leg portion connected to said second connecting end of said first leg portion remote from said first open end of said U-shaped channel;

said first end of said loop portion comprising a sharp, substantially pointed tip for insertion through articles of clothing, fabric, and the like, for threading the articles onto said loop for storage; said first end of said loop portion further having a reduced-thickness portion which enters into said first open end of said first leg portion of said U-shaped channel and rides along said U-shaped channel substantially along the lengths of said first leg portion and said second leg portion until it reaches said second closed end of said U-shaped channel for locking thereby;

said first open end of said U-shaped channel having a width approximately equal to the thickness of said reduced-thickness portion, so that substantially only said reduced thickness portion may enter therein for locking the first and second ends of said loop portion together;

said second leg portion of said U-shaped channel comprising a first narrow insert end directly adjacent to said second connecting end of said first leg portion, said first narrow insert end having a width slightly less than the thickness of said reduced-thickness portion, whereby force must be applied to urge said reduced-thickness portion past said first narrow insert end; whereby said first end of said loop portion does not become unlocked by the accidental movement of the reduced-thickness portion in the U-shaped channel during laundering, or the like, in reverse manner from that of locking the first and second ends of said loop portion together;

said second leg portion having a second end constituting said second closed end of said U-shaped channel, such that said second closed end lies directly adjacent to said first open end of said U-shaped channel;

said first leg portion having a hook-shaped configuration such that said first leg portion bends toward said first narow insert end of said second leg portion in a direction both toward said second closed end of said U-shaped channel and toward said second leg portion, said second leg portion being substantially linear in extent;

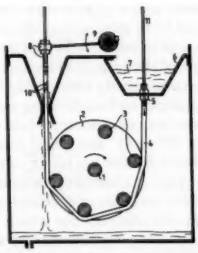
whereby forces acting on the ring during laundering, or the like, that tend to place tensile and bending forces on the first end of the loop portion are prevented from accidentally unlocking the ring by separating the first end from the locking member.

4,503,592

FELTING MACHINE FOR SLIVER OR YARN

Jan Krouwel, Hengelo, Netherlands, assignor to Hollandse Signaalapparaten B.V., Netherlands

Filed Dec. 29, 1982, Ser. No. 454,210
Claims priority, application Netherlands, Jan. 12, 1982, 8200085
Int. Cl.³ D04H 17/00
U.S. Cl. 28—219 **4 Claims**



1. Felting machine provided with elastic guide tubes which perform such an oscillating motion that axial forces act on the slivers or yarns supplied to the separate guide tubes to achieve a felting of the slivers or yarns, characterised in that the felting machine comprises a lever mechanism provided with first adjusting means for exerting an equal and adjustable tension on a number of the guide tubes.

4,503,593

STUFFER BOX CRIMPER

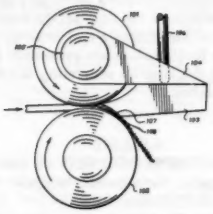
Terry S. Floyd, Clover, and James A. Williams, Van Wyck, both of S.C., assignors to Celanese Corporation, New York, N.Y.

Filed Jan. 3, 1983, Ser. No. 455,096
Int. Cl.³ D02G 1/12
U.S. Cl. 28—263 **9 Claims**

1. An improved stuffer box crimping apparatus having the

ability to reduce crimp coefficient of variations in tow being crimped, said apparatus being of the type employing a pair of feed rolls having a bite therebetween and a rectangular cross-section crimping chamber off-set from the bite of said feed rolls, the improvement comprising forming substantially all of one wall of the crimping chamber from the arcuate surface of a pivoted doctor blade having a tip portion and a heel and the opposite wall from the rotating arcuate surface of one of the cylindrical feed rolls, said arcuate surface of said pivoted doctor blade substantially conforming to the curvature of said rotating surface forming said opposite wall of said crimping chamber, the rectangular cross-sectional area of the crimping chamber being of shallow depth and substantially constantly diminishing toward the exit portion thereof, said pivoted doctor blade having a convergence angle of from 20° to 45° and a heel contact angle of up to 80°, said pivoted doctor blade being pivotally mounted to that feed roll which is nearest the tip portion of said pivoted doctor blade, said arcuate surface of said feed roll being provided with a scraper blade positioned immediately beneath the heel of said pivoted doctor blade.

6. A method of crimping a bundle or tow of continuous filaments with crimp coefficient of variation reduction, said



method comprising feeding said bundle or tow of continuous filaments through the nip of a set of rotating cylindrical feed rolls into a shallow depth crimping chamber, one wall of which is formed by the arcuate surface of a doctor blade having a tip portion and a heel pivotally mounted to that feed roll which is nearest to the tip portion of said pivoted doctor blade and positioned to fit closely into the nip of said feed rolls and the opposite wall of which is formed by the rotating cylindrical surface of one of the rolls, said arcuate surface of said pivoted doctor blade substantially conforming to the curvature of said rotating cylindrical surface forming said opposite wall of said crimping chamber, said doctor blade having a convergence angle of from 20° to 45° and a heel contact angle of up to 80°, said doctor blade further operating to provide a back pressure within said crimping chamber to impede the movement of the continuous filament from said crimping chamber and causing the formation of a crimped tow which is then advanced along and out of said crimping chamber by the rotating cylindrical surface of that feed roll forming said opposite side of said crimping chamber, said crimped tow being released from said rotating cylindrical surface by a scraper blade positioned immediately beneath the heel of said pivoted doctor blade.

4,503,594

METHOD FOR FABRICATING AN ORIFICE FITTING FOR A GAS PRESSURE DIFFERENTIAL-MEASURING SYSTEM

Adam F. Gall, and Howard P. McJunkin, Jr., both of Charleston, W. Va., assignors to McJunkin Corporation, Charleston, W. Va.

Division of Ser. No. 436,458, Oct. 25, 1982, Pat. No. 4,422,339. This application Jul. 14, 1983, Ser. No. 513,859

Int. Cl.³ B21D *53/10*

U.S. Cl. 29—157 R **3 Claims**

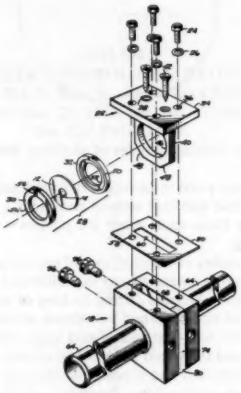
1. A method for constructing an orifice fitting for a gas pressure differential-measuring system, comprising:

(a) providing two block members each with an inner face and a throughbore extending through that face;

(b) providing two lengths of pipe, each flared at the inner end thereof to define a radially outwardly projecting circumferential flange;

(c) inserting each pipe into a respective throughbore through the inner face of the respective block member, with an outer end portion of that pipe protruding from the opposite end of the respective throughbore to provide a pipe stub extending from the respective block;

(d) circumferentially welding each pipe stub to the respective block where that pipe stub emerges from the respective throughbore, thus providing two orifice block assemblies;



(e) providing a U-shaped spacer having two legs and a bridge, presenting the two orifice block assemblies, inner faces inwards, in sandwiching relation to the U-shaped spacer and welding about the external periphery of the U-shaped spacer, between the U-shaped spacer and both said blocks to form a unitary body having a laterally opening slot through one side, between the legs of the U-shaped spacer and in communication with the inner ends of both of said pipes;

(f) machining said side of said body to provide for the mounting and sealing of an orifice holder assembly thereto; and

(g) forming a pressure tap through each said orifice block assembly and the respective pipe stub wall adjacent said slot.

4,503,595

METHOD FOR FORMING A BRAKING PISTON FOR A DISC BRAKE

David D. Sheill, Farmington Hills, Mich., assignor to Rockwell International Corporation, Pittsburgh, Pa.

Filed Aug. 31, 1983, Ser. No. 528,327

Int. Cl.³ B23P *11/00*

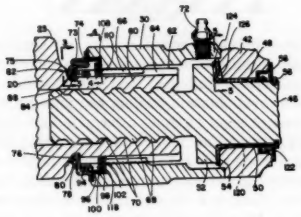
U.S. Cl. 29—434 **2 Claims**

1. A method for forming a braking piston and housing for a disc brake of the type which includes a disc mounted for rotation about an axle, said brake housing mounted on said axle in alignment with a friction surface of said disc, said housing having a piston receiving bore therein, said braking piston having an interior end at least partially mounted within said housing and an external end outwardly of said housing adjacent said friction surface of said disc, brake actuation means mounted on said housing, a powershaft mounted within said housing in coaxial alignment with said braking piston and capable of selective rotation by said brake actuation means, said powershaft having worm gear teeth thereon engaged with

mating teeth on said interior end of said braking piston, flexible boot seal means surrounding said interior end of said braking piston and having a first end secured to said housing and a second end extending into a circumferential channel around said braking piston, said method comprising the steps of: forming the bore in said housing with a plurality of first axially extending splines around an interior cylindrical surface thereof,

providing said braking piston with said interior end having a cylindrical outer surface;

forming a circumferential groove in said cylindrical outer surface in a portion thereof which is toward said external end with a first radial wall remote from said external end of a second radial wall adjacent said external end with a predetermined distance between said first and said second radial walls;



shaping a plurality of second axially extending splines in said external surface of said interior end of said braking piston matching said first splines in said interior surface of said housing with said second splines terminating at said first radial wall of said circumferential groove;

forming a ring element of resilient, hard plastic having a radial slot therein and a first side and a second side with a distance therebetween which is less than said predetermined distance between said first radial wall and said second radial wall; and

expanding said ring element for encirclement of said second axially extending splines and axial movement therealong to install said ring element in said circumferential groove with said first side against said first radial wall and said second side separated from said second radial wall to define said circumferential channel therebetween.

4,503,596

TRANSFER TYPE WORKING SYSTEM

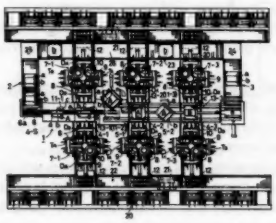
Jinsei Ida, Sayama; Tsutomu Fujita, Kawagoe; Kenzaburo Matsuo, Kawagoe; Fumio Higuchi, Kawagoe, and Mitsuo Tamura, Kawagoe, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 10, 1982, Ser. No. 387,211

Claims priority, application Japan, Jun. 12, 1981, 56-89510

Int. Cl.[3] B23Q *3/157, 41/02*

U.S. Cl. 29—568 **3 Claims**



1. A transfer type working system comprising a transfer line for intermittently conveying workpieces thereon having plural stages of working stations disposed in front and rear relationship, each of the working stations having at least one machine tool for working upon one of the workpieces on that station, each of the machine tools comprising a ganghead replaceable machine tool having plural gangheads arranged to be selectively operable and each of the working stations having at a preceding position thereof with a front sensor means for reading the kind of workpiece on a preceding position so that, in the course of conveying any of the workpieces to each of the working stations, one of the gangheads that corresponds to the kind of the workpiece read is previously selected for operation by a signal at the front sensor means, a rear sensor means for reading the kind of workpiece which has been conveyed to that particular working station so that, after the correspondence between the kind of the workpiece which has been conveyed to the particular working station and the previously selected ganghead is confirmed to be correct, the selected ganghead may be brought into a working operation, the rear sensor means being used also for the front sensor means for the next stage working station, and control means connected to the machine tool and operatively coupled to the front and the rear sensor means for selecting the appropriate ganghead, for confirming the same to be correct, and for controlling the operation of the selected ganghead.

4,503,597

METHOD OF FORMING A NUMBER OF SOLDER LAYERS ON A SEMICONDUCTOR WAFER

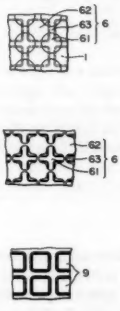
Tadao Kushima, Ibaraki; Masahiro Gooda, Hitachi; Tasao Soga, Hitachi, and Toshitaka Yamamoto, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 7, 1983, Ser. No. 464,379

Claims priority, application Japan, Feb. 8, 1982, 57-17558

Int. Cl.[3] H01L *21/00*

U.S. Cl. 29—569 R **26 Claims**



1. A method of forming a number of discrete solder layers on a semiconductor wafer, comprising steps of:

forming at least on one major surface of said semiconductor wafer a number of first regions easily wettable with solder and second regions which are difficultly wettable with solder, said second regions separating said first regions from one another;

disposing a solder foil on said one major surface of said semiconductor wafer;

disposing on said solder foil positioned on said semiconductor wafer a plate-like jig including a plate and projections formed at least on one surface of said plate in such a manner that said projections face said solder foil, said projections having a height substantially identical to the thickness of said solder layers; and

heating a stacked structure including said semiconductor wafer, said solder foil and said plate-like jig in a non-oxidizing atmosphere to a sufficiently high temperature for said solder foil to be molten, whereby solder layers having

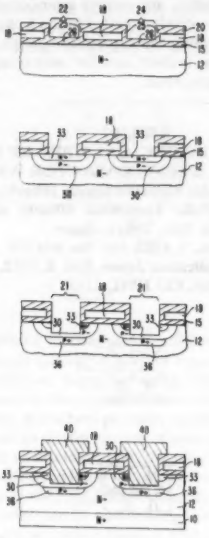
a uniform thickness and a flat surface adjacent said plate-like jig are formed.

4,503,598

METHOD OF FABRICATING POWER MOSFET STRUCTURE UTILIZING SELF-ALIGNED DIFFUSION AND ETCHING TECHNIQUES

Madhukar B. Vora, Los Gatos, and Vikram M. Patel, Saratoga, both of Calif., assignors to Fairchild Camera & Instrument Corporation, Mountain View, Calif.

Filed May 20, 1982, Ser. No. 380,170
Int. Cl.³ H01L *21/22, 21/467*
U.S. Cl. 29—571 **14 Claims**



1. A method of fabricating a semiconductor structure comprising:

forming a pair of spaced apart electrically conductive gate electrodes on a semiconductor drain region of first conductivity type, the electrodes being separated from the drain region by a layer of insulating material;

introducing first and opposite conductivity type impurity into the drain region between the spaced apart gate electrodes by using the gate electrodes to mask portions of the drain region to thereby form source and gate regions, respectively, the first conductivity type impurity being everywhere separated from the drain region by the opposite conductivity;

removing a portion of the drain region between the spaced apart gate electrodes to form an opening extending through the source region but not through the gate region;

depositing electrically conductive material into the opening in contact with both of the source and gate regions but not in contact with any of the drain region and not in contact with the gate electrodes; and

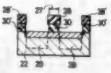
providing electrical connections to each of the drain region, the gate electrodes, and the electrically conductive material deposited in the opening.

4,503,599

METHOD OF FABRICATING FIELD EFFECT TRANSISTORS

Kiichi Ueyanagi, Kokubunji; Susumu Takahashi, Nishitama; Yasunari Umemoto, Kokubunji, and Michiharu Nakamura, Nishitama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 28, 1983, Ser. No. 462,014
Claims priority, application Japan, Jan. 29, 1982, 57-11664
Int. Cl.³ H01L *21/265*
U.S. Cl. 29—571 **18 Claims**



1. A method of fabricating a field effect transistor, comprising:

the step of forming a surface portion of a semiconductor substrate with an impurity region for a channel;

the step of forming a first material layer above said semiconductor substrate;

the step of forming at least a second material layer above said first material layer, which second material layer has a different composition from said first material layer;

the step of forming a mask pattern required for formation of source and drain regions;

the step of selectively removing the second material layer and then the first material layer through the mask pattern to form a first material pattern which has a width substantially equal to that of a gate electrode, in a position as is to be formed with said gate electrode, and to form a second material pattern above said first material pattern that has a width larger than that of said first material pattern;

the step of removing said mask pattern;

the step of forming source and drain regions by an ion implantation using said first and second material patterns as a mask;

the step of annealing the semiconductor substrate at the positions where ion implantation has been performed;

the step of forming source and drain electrodes in contact with said source and drain regions;

the step of forming a third material layer, which has a selectivity with respect to said first material layer in its etching characteristics, on the semiconductor body thus far prepared by the foregoing steps;

the step of forming at least an aperture by removing said first material pattern; and

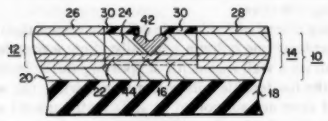
the step of forming said gate electrode in said aperture.

4,503,600

PROCESS FOR MANUFACTURING A BURIED GATE FIELD EFFECT TRANSISTOR

Riro Nii, Tokyo; Nobuyuki Toyoda, and Akimichi Hojo, both of Yokohama, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki, Kawasaki, Japan

Filed Feb. 15, 1983, Ser. No. 466,578
Claims priority, application Japan, Feb. 22, 1982, 57-25909
Int. Cl.³ H01L *21/265*
U.S. Cl. 29—571 **5 Claims**



1. A process for manufacturing a buried gate field effect transistor, comprising, in the order mentioned, the steps of:

(a) providing a structure including a semi-insulative substrate, an undoped gallium arsenide layer formed on the semi-insulative layer, a GaAlAs layer formed on the undoped gallium arsenide layer, and an undoped semiconductor layer formed on the GaAlAs layer, a first impurity region acting as a source region being formed in the undoped gallium arsenide layer, a second impurity region acting as a drain region being formed in the undoped gallium arsenide layer, and a channel layer being provided between the first and second impurity regions;

(b) forming a V-shaped groove in a portion of the undoped semiconductor layer above the channel layer in the undoped gallium arsenide layer, by etching the undoped semiconductor layer with an etching solution which has a high selectivity toward the crystal face of the undoped semiconductor layer;

(c) vapor-depositing a metal likely to form an alloy type of Schottky junction with the undoped semiconductor layer, on the inner wall surfaces of the V-shaped groove; and

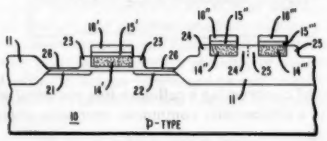
(d) heating the resultant structure until the bottom end of the V-shaped groove enters the GaAlAs layer, and the channel layer attains a prescribed threshold voltage to form an alloy-type Schottky junction between the compound semiconductor and the metal.

4,503,601

OXIDE TRENCH STRUCTURE FOR POLYSILICON GATES AND INTERCONNECTS

Samuel Y. Chiao, Fort Collins, Colo., assignor to NCR Corporation, Dayton, Ohio

Filed Apr. 18, 1983, Ser. No. 486,275
Int. Cl.³ H01L *21/26*
U.S. Cl. 29—571 **4 Claims**



1. A process for forming a metal covered high conductivity region of a substrate and a metal covered polysilicon conductor in close proximity to said region, said process comprising:

forming said polysilicon conductor on selected portions of said substrate from a highly doped polysilicon layer having a masking member thereon;

thermally oxidizing at a relatively low temperature in the range of 700–750 degrees C. for a time sufficient to form a relatively thick oxide layer on the side surfaces of said polysilicon conductor and a relatively thin oxide layer on the uncovered portions of said substrate;

removing the relatively thin oxide layer on said uncovered portions of said substrate;

doping said uncovered portions of said substrate to a high conductivity;

removing the masking member to expose the upper surface of said polysilicon conductor; and

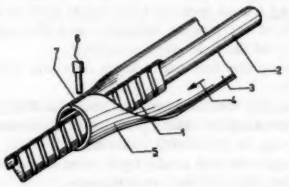
forming a metal layer over said exposed, highly doped portion of said substrate and polysilicon conductor.

4,503,602

METHOD FOR THE MANUFACTURE OF A SUPERCONDUCTING HOLLOW CONDUCTOR

Hans Hillmann, Rodenbach, Fed. Rep. of Germany, assignor to Vacuumschmelze GmbH, Hanau, Fed. Rep. of Germany

Filed Jun. 17, 1982, Ser. No. 389,558
Claims priority, application Fed. Rep. of Germany, Jul. 10, 1981, 3127292
Int. Cl.³ H01B *5/08*; H01V *11/00*
U.S. Cl. 29—599 **5 Claims**



1. A method for manufacturing a conductor arrangement of superconductive conductor strands, in which the conductor strands rest in helical fashion against the inside wall of a tubular carrier body, comprising:

(a) winding the conductor strands to form a helix which has a hollow central part;

(b) arranging the hollow helix in a tubular carrier body; and

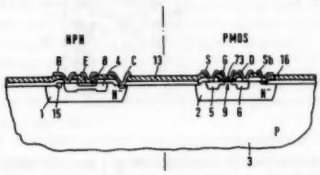
(c) subsequently deforming the tubular carrier body by drawing or rolling into a tube of smaller inside diameter than the original outside diameter of the helix made up of the helically wound conductor strands to thereby increase the pitch of the helix causing large spaces to be formed between turns but without cross section reduction of said strands.

4,503,603

PROCESS FOR MANUFACTURING A MONOLITHIC INTEGRATED SOLID-STATE CIRCUIT HAVING AT LEAST ONE INSULATED-GATE FIELD-EFFECT TRANSISTOR AND AT LEAST ONE BIPOLAR TRANSISTOR

Lother Blossfeld, Freiburg-Hochdorf, Fed. Rep. of Germany, assignor to ITT Industries, Inc., New York, N.Y.

Filed May 5, 1983, Ser. No. 492,459
Claims priority, application European Pat. Off., May 6, 1982, 82103910.4
Int. Cl.³ H01L *21/225, 21/265, 27/04*
U.S. Cl. 29—571 **4 Claims**



1. In a process for manufacturing a planar monolithic inte-

grated solid-state circuit which includes at least one insulated-gate field-effect transistor and at least one bipolar transistor, each of the transistors having a doped substrate region of a first conductivity type formed in a silicon substrate surface portion of a second conductivity type, the improvement comprising the steps of:

forming a masking layer over the substrate surface portion including the transistor substrate regions by forming a first insulator layer on said substrate surface portion and a second upper nitride layer on said insulator layer, and forming at least said insulator layer of a composition and thickness to form the gate insulator layer of the field-effect transistor;

forming a mask over portions of said masking layer to mask at least the emitter and contact areas of the bipolar transistor and the gate area, adjacent source and drain regions and the contact area of the field-effect transistor;

removing the exposed portions of the masking layer which are not covered by the mask;

removing the mask from the masked portions of the masking layer;

forming a first oxide layer over the substrate surface portion, the transistor regions and the masking layer portions;

forming a mask over said first oxide layer to define the base area of the bipolar transistor and the source and drain areas of the field-effect transistor;

removing the first oxide layer over the defined transistor areas;

ion doping the base, source and drain regions including penetrating unmasked portions of said masking layer;

removing the remaining oxide mask;

forming a second oxide layer over the surface areas not having the masking layer thereon;

forming a mask over the masking layer above the gate region of the field-effect transistor;

removing the remaining unmasked portions of the masking layer;

ion doping the exposed transistor regions including at least the bipolar transistor emitter region;

removing the masking layer mask;

forming a foreign oxide layer;

activating the implanted doping;

forming a mask on the foreign oxide layer to define the transistor contact areas and said gate region masking layer;

removing the oxide layer over said contact areas and said gate region masking layer; and

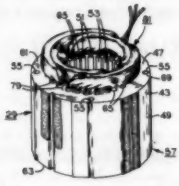
forming the contacts and conductor leads as well as the gate electrode and corresponding lead thereof.

4,503,604

METHODS OF MANUFACTURING DYNAMOELECTRIC MACHINE STATORS

Alvin L. Rediger, Zeeland, Mich., assignor to General Electric Company, Fort Wayne, Ind.

Filed Sep. 2, 1980, Ser. No. 183,176
Int. Cl.³ H02K *15/02*
U.S. Cl. 29—596 **5 Claims**



1. A method of manufacturing a metallic magnetizable core of a dynamoelectric machine stator comprised of a plurality of assembled together metallic platelike laminations jointly defining an outer peripheral surface of the core, the method comprising the steps of:

juxtaposing and aligning the metallic platelike laminations in stacked relation along an axis;

shaping the core by squaring the opposite end faces of the core in the stacked relation of the laminations;

establishing a plurality of preselected separated pressure regions angularly spaced about the axis of the laminations in the stacked relation thereof and between the opposite end faces of the core by compressing the core at such preselected angularly spaced apart regions;

heating the core;

flowing a bead of hardenable adhesive material downwardly in at least one column generally along a preselected flow path on a wall means for supporting the at least one bead of the hardenable adhesive material while the wall means and core are supported in sufficiently spaced apart relation that the bead and core are out of contact with one another;

laterally relatively moving the heated core and wall means with respect to the axis of the laminations;

touching a fractional portion of the perimeter of the core peripheral surface along at least one preselected axial contact length thereof and angularly between at least some of the pressure regions with a selected contact surface of the at least one bead of the hardenable adhesive material flowing downwardly in the preselected flow path thereof on the wall means and maintaining the core peripheral surface and the wall means in a predetermined spaced apart relation;

transferring by capillary action a part of the hardenable adhesive material in the at least one bead thereof into an adhesive region of the core generally adjacent the core peripheral surface between at least some next adjacent laminations along the at least one preselected axial contact length of the core peripheral surface upon the touching thereof with the selected contact surface of the at least one bead; and

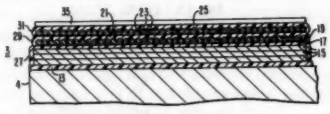
disestablishing the preselecting separated pressure regions of the core.

4,503,605

METHOD OF MAKING A CELLULOSE-FREE ELECTRICAL WINDING

Richard D. Buckley, Watkinsville, Ga., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 264,151, May 15, 1981, abandoned.
This application Aug. 18, 1983, Ser. No. 524,227
Int. Cl.³ H01F *7/06*
U.S. Cl. 29—605 **13 Claims**



1. A method of constructing a cellulose-free electrical winding structure in a substantially continuous operation, comprising the steps of:

providing winding support means, a liquid resin application station, and a resin gelling station;

providing relative rotating motion between the winding support means and the resin application and gelling stations;

forming a first winding layer having at least one conductor turn by applying a conductor to said winding support means;

providing electrical insulation on said first winding layer having a predetermined thickness dimension;

said step of providing electrical insulation including the steps of:

building up said electrical insulation in a plurality of turns by applying a thin coating of liquid resinous insulation from said liquid resin application station during each turn of said relative rotational motion, instantly gelling, in place, each turn of said liquid resinous insulation coating to a firmness sufficient to support a winding layer, and selecting the thickness of each turn of said liquid coating to accommodate shrinkage which occurs when the liquid coating gels turn by turn, to control and limit the maximum size of shrinkage voids;

and forming a second winding layer having at least one conductor turn by applying a conductor to the gelled resinous electrical insulation.

4,503,606

AUTOMATIC ASSEMBLING MACHINE

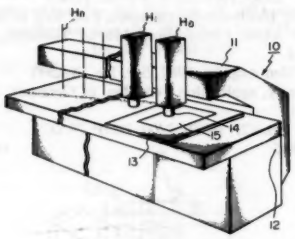
Yasuhiro Honda; Katumi Ueno; Genichi Nishizaki; Harumi Kitahara, and Hiroshi Kamioka, all of Tokorozawa, Japan, assignors to Citizen Watch Company Limited, Tokyo, Japan

Filed Dec. 22, 1981, Ser. No. 333,496

Claims priority, application Japan, Dec. 26, 1980, 55-184078; Dec. 29, 1980, 55-186851; Dec. 29, 1980, 55-189330[U]; Dec. 29, 1980, 55-189331[U]; Jan. 27, 1981, 56-10445

Int. Cl.³ H01R *43/04*

U.S. Cl. 29—701 **3 Claims**



1. An automatic printed circuit board assembly machine in which a plurality of electronic parts are assembled on a printed circuit board at a plurality of predetermined assembling positions thereof, comprising:

a base;

a frame secured to said base;

assembling heads mounted on said frame;

a movable table provided on said base and carrying thereon said printed circuit board, said table being movable in an operating area to a selected one of a plurality of predetermined assembling head position coordinates, respectively, in dependence on the kinds of electronic parts to be assembled on said circuit board such that an origin of said printed circuit board is positioned at said selected one of said plurality of predetermined assembling head position coordinates to align said plurality of predetermined assembling positions to another plurality of predetermined assembling positions determined by said selected one of said plurality of predetermined assembling head position coordinates;

assembling position coordinates memory means for storing assembling position coordinates corresponding to said plurality of predetermined assembling positions, respectively, of said printed circuit board;

head position coordinates memory means for storing said predetermined assembling head position coordinates;

head selection command memory means for storing data of which one of said assembling heads is to be selected;

head selection command selector means for selecting said one of said assembling heads in response to an output signal from said head selection command memory means;

an arithmetic unit responsive to output signals from said assembling position coordinates memory means and said head position coordinates memory means for producing an output data in dependence on said assembling position coordinates and said selected one of said predetermined assembling head position coordinates; and

means for operating said movable table in response to the output data of said arithmetic unit;

said assembling heads comprising a rotary shaft reciprocated rotatively through a fixed angle, a plurality of rocker arms freely rotatably mounted on said rotary shaft, a coupling member pivotably supported on each said rocker arm, a plurality of drive levers,

corresponding to said rocker arms,

secured to said rotary shaft, means for coupling and decoupling said coupling member and said drive lever, said latter means comprising a control shaft and control pins for respective ones of said rocker arms, said control pins being fixed to said control shaft at angles that differ from one control pin to the next such that rotating said control shaft causes only a predetermined one of said control pins to contact and thereby pivot the corresponding coupling members, whereby the latter is coupled with the corresponding drive lever to rotatively reciprocate the corresponding rocker arm.

4,503,607

METHOD FOR AUTOMATICALLY MOUNTING NON-LEAD ELECTRONIC COMPONENTS ON PRINTED-CIRCUIT BOARDS

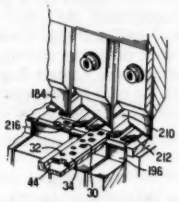
Koichi Asai, Nagoya; Kunio Oe, Chiryu, and Mamoru Tuda, Okazaki, all of Japan, assignors to Fuji Machine Mfg. Co., Ltd., Chiryu, Japan

Division of Ser. No. 277,105, Jun. 25, 1981, Pat. No. 4,438,559. This application Dec. 19, 1983, Ser. No. 562,812

Claims priority, application Japan, Jun. 27, 1980, 55-88326; Aug. 6, 1980, 55-108613; Aug. 9, 1980, 55-109587; Aug. 20, 1980, 55-114274

Int. Cl.³ H05K *3/30*

U.S. Cl. 29—832 **13 Claims**



1. A method for automatically mounting, on a workpiece placed on a mounting apparatus, non-lead electronic components which have previously been stored mutually independently within a multiplicity of apertures formed in a strip member of an electronic component carrying tape, and for thereby forming an electronic circuit on the workpiece, said multiplicity of apertures being equally spaced longitudinally of said strip member and covered with a covering tape disposed over said strip member, said method comprising the steps of:

feeding in an intermittent manner said carrying tape with said covering tape facing up, the distance of each feeding movement of said carrying tape being equal to a spacing of said multiplicity of apertures;

separating said covering tape from said strip member of said carrying tape so as to uncover at least a leading one of said multiplicity of apertures;

holding, with a gripper portion of a transfer member of said mounting apparatus, a leading portion of said carrying tape which includes said leading aperture uncovered in said separating step, and subsequently severing said carrying tape between said uncovered leading aperture and the

following aperture, the severed leading portion constituting a unit carrying tape;

transferring said unit carrying tape held with said transfer member by moving the latter along a line of transfer to a desired position adjacent to a pick-up member of a loading assembly of said mounting apparatus; and

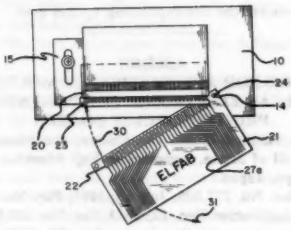
picking up, with said pick-up member, the electronic component stored in said uncovered aperture in said unit carrying tape which has been transferred to said desired position, then moving said electronic component to a specified position on said workpiece, and mounting the same on the workpiece at said specified position.

4,503,608

CARD EDGE CONNECTOR TOOL AND A METHOD OF JOINING A CARD EDGE CONNECTOR

Evan Evans, Dallas, Tex., assignor to Elfab Corporation, Lewisville, Tex.

Filed Feb. 16, 1983, Ser. No. 467,123
Int. Cl.³ H05K *3/30*
U.S. Cl. 29—839 **9 Claims**



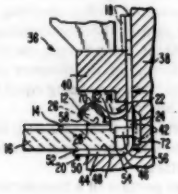
1. A method of inserting a printed circuit board, having equally spaced conductive patterns on the edge of at least one side of the printed circuit board, into and between equally spaced opposing contact fingers on a printed circuit board edge connector, comprising the steps of; positioning the printed circuit board and card edge connector in a predetermined relation to each other and rotating the printed circuit board between the opposing contact fingers so that the conductive patterns on the edge of the printed circuit board are sequentially inserted between and come into contact with the contact fingers.

4,503,609

LOW-INSERTION FORCE METHOD OF ASSEMBLING A LEAD AND A SUBSTRATE

Robert D. Mackay, North Andover, Mass., assignor to AT&T Technologies, Inc., New York, Nebr.W YORK

Filed Oct. 29, 1982, Ser. No. 437,587
Int. Cl.³ H05K *3/00*
U.S. Cl. 29—843 **6 Claims**



1. A low-insertion force method of assembling a lead and a substate, wherein the lead includes first and second resilient substrate clamping portions extending in opposed spaced relationship from a lead stem and a lead stem extension, respectively, which comprises the steps of:

positioning the lead on a support member with spaced portions of the lead stem and the lead stem extension supported on the support member and with an intermediate portion of the lead stem extension between the spaced supported portions disposed adjacent a recess in the support member in spaced unsupported relationship to the support member;

causing relative movement between the lead on the support member and the substrate such that the substrate is received between the substrate clamping portions of the lead in assembled relationship;

inter-engaging an end of the substrate and the intermediate portion of the lead stem extension between the substrate clamping portions so as to flex the unsupported intermediate portion of the lead stem extension into the recess in the support member and to flex the supported portions of the lead stem and the lead stem extension about the end of the substrate as a fulcrum and thereby force the substrate clamping portions toward one another into firm engagement with respective opposite sides of the substrate; and

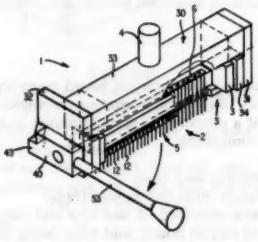
dis-engaging the lead and the support member after the lead and the substrate have been assembled to one another.

4,503,610

METHOD AND APPARATUS FOR MOUNTING OF ELECTRICAL CONNECTORS

Alois R. Resch, Heilbronn-Kirchhausen, Fed. Rep. of Germany, assignor to Allied Corporation, Morris Township, Morris County, N.J.

Filed Aug. 16, 1982, Ser. No. 408,547
Claims priority, application Fed. Rep. of Germany, Aug. 21, 1981, 3133155
Int. Cl.³ H05K *3/00*; B23P *19/00*
U.S. Cl. 29—845 **10 Claims**



1. A method of assembling an electrical connector assembly comprising a connector body of the type having a mating face, a terminating face, and an array of slots extending between the faces, a sheet element having an array of openings therethrough, and a plurality of contact elements each having a first portion thereof disposed in only one said opening and a second portion thereof disposed in only one said slot, the method being characterized by

supporting the terminating face of said connector body on a mounting plate,

positioning the sheet element above the connector body so that each said array of said slots and openings are aligned and the sheet element is supported on said mating face, and

pressing each of the contact elements into respective ones of said slots of the sheet element and into openings of the connector body below said sheet element whereby each said contact element has its first portion disposed in the one said opening and its second portion disposed in the one said slot.

7. A pressing tool for at least one contact element comb of the type comprising a plurality of contact elements connected

by a pilot strip with each of the elements being laterally separated by a like distance separating a respective plurality of openings in a plate, said tool being adapted to receive said contact element comb and press said comb into respective openings of said plate, said tool being characterized by a frame portion, a clamping portion pivotally mounted to said frame portion, said clamping portion being designed in such a way that it severes the pilot strip when being moved in a pressing direction for the contact elements and comprising a first clamping element in the form of a holder and a second clamping element in the form of a flap, both of said elements being pivotally mounted on said frame portion for movement between a receiving position, a clamping position and a pressing position, and a spring for biasing said holder into its receiving position.

4,503,611

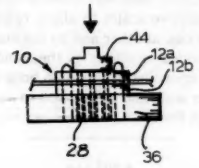
METHOD OF MAKING A CIRCUIT ASSEMBLY

Stephen A. Sampson, and Thor F. Olson, both of Wheaton, Ill., assignors to Molex Incorporated, Lisle, Ill.

Continuation of Ser. No. 303,347, Sep. 18, 1981, abandoned. This application Aug. 26, 1983, Ser. No. 526,519

Int. Cl.³ H01R *4/00*

U.S. Cl. 29—845 **2 Claims**



1. A method of making a plug-type connector assembly including a flat, flexible circuit member having a flat insulative substrate and at least one flat conductor defined on a surface thereof, and first and second relatively rigid wafers made from an electrically nonconductive material with each of said wafers having at least one aperture extending therethrough adapted to receive generally elongated metallic pin conductor, said method comprising the steps of:

forcing the pin conductor through the aperture of the first wafer until one end of the pin conductor is flush with a surface of said first wafer,

arranging said wafers in opposed relationship on opposite sides of the flexible circuit member, so that the aperture in each of said wafers is aligned with the aperture of the other wafer and with the flat conductor defined on the circuit member, and

forcing said pin conductor through said circuit member flat conductor and into the aligned aperture of the second wafer thereby forming an aperture in said circuit member flat conductor to establish electrical connection between the flat conductor of the circuit member and an intermediate portion of said pin conductor, with a portion of said pin conductor frictionally secured and force fitted within said apertures within said wafers and the other end of said pin conductor extending outwardly from said second wafer, and to secure the wafers and flexible circuit member together in a stable mounting.

4,503,612

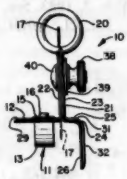
SAFETY GUARD EQUIPPED CARDBOARD BOX CUTTER

Raymond E. Davis, 3636 Remington, Plano, Tex. 75023

Filed Aug. 8, 1983, Ser. No. 521,036

Int. Cl.³ B26B *29/02*

U.S. Cl. 30—2 **15 Claims**



1. A safety guard equipped cardboard cutter comprising: a body section generally enclosing and mounting a cutter blade; a handle at the top of said body section; guide plate means for supporting and guiding the cutter over cardboard being cut by the cutter; said cutter blade positionable in its mounting in said body section with a cutting edge projection below said guide plate means sufficiently far to cut through the thickness of cardboard being cut; and a resiliently deflectable spring safety guard mounted on said cardboard cutter with a guard shield projection extended through an opening in said guide plate means presenting a protective profile for said cutter blade beneath said guide plate means; wherein said resiliently deflectable spring safety guard is mounted on said guide plate means with the safety guard retractable by cardboard being cut as the cardboard is being cut and as the cutter is lifted away from cardboard just cut the guard shield of said safety guard returns to the blade protection state from the possibility of accidental hand contact with the cutting edge of the cutter blade; said resiliently deflectable spring safety guard is stamp formed from a strip of spring metal; and wherein said guard shield is a stamp formed projection in the strip of spring metal forming said resiliently deflectable spring safety guard.

4,503,613

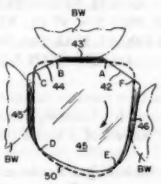
METHOD FOR EDGE GRINDING MULTIFACETED LENSES

Michael J. Yax, Rochester, N.Y., assignor to Textron, Inc., Providence, R.I.

Filed Mar. 14, 1983, Ser. No. 475,331

Int. Cl.³ B24B *9/14*

U.S. Cl. 51—284 E **8 Claims**



1. A method of edge grinding multifaceted lenses, comprising

edge grinding a lens blank to a first configuration,

bevel grinding a first plurality of spaced, beveled surfaces on the edge of the blank at spaced intervals around at least a portion of its periphery, and

thereafter bevel grinding a beveled surface on the blank in each space between each adjacent air of said first plurality of surfaces, thereby to form on the blank a series of inter-

secting, beveled surfaces the intersections of which define a series of sharp corners or facets on the lens.

4,503,614

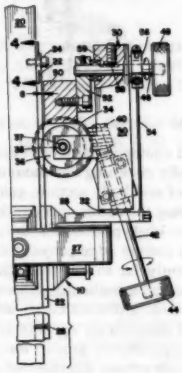
COORDINATE MEASURING MACHINE HAVING VERTICAL FINE FEED AND LOCK MECHANISM

John J. Tuss, Englewood, Ohio, assignor to The Warner & Swasey Company, Cleveland, Ohio

Filed Feb. 7, 1983, Ser. No. 464,245

Int. Cl.³ G01B 5/02

U.S. Cl. 33—1 M **12 Claims**



1. A coordinate measuring machine of the type including a base, a carriage horizontally movable with respect to said base and supporting a vertically movable probe shaft, means for measuring a part carried on the base of the measuring machine, the improvement wherein said probe has a ferromagnetic drive strip extending along the length thereof and wherein vertical movement of the vertically movable probe is controlled by first and second control means, both of said control means coupled to said carriage, said first control including a magnet and means operable to move the magnet between a first position at which said magnet is closely adjacent to and exerting an attractive force on said drive strip of said probe shaft to a second position displaced away from said drive strip and said second control means being operatively coupled to said probe shaft to be selectively operable to be able to move the probe shaft upward or downward when said magnet is in its first position but not when the magnet is in its second position.

4,503,615

GUIDE STRUCTURE

Jerry B. Schreiber, 9905 SW. 97 Pl., Miami, Fla. 33176

Filed Feb. 17, 1983, Ser. No. 467,315

Int. Cl.³ G01B 5/03

U.S. Cl. 33—1 M **7 Claims**

1. A guide structure used in combination with a standard form and configured for locating blank spaces on a display form of a display screen of a word processor, said structure comprising:

(a) a line scale including a linear, elongated configuration and disposed to extend the length of the standard form,

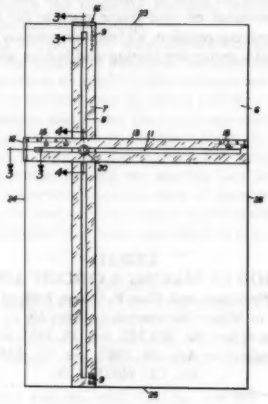
(b) a character scale having a linear, elongated configuration and disposed to extend along the width of the standard form and in substantially perpendicular relation therewith,

(c) attachment means movably mounted on each of said line scale and character scale and structured for movably interconnecting said respective scales and allowing movement of each scale relative to the other,

(d) connecting means removably attaching each of said respective scales to the standard form, said connecting means comprising a first connector and a second connector affixed to said line scale and said character scale respectively,

(e) said first connector and said second connector structured and disposed to slidingly engage and movably attach said line scale and said character scale respectively along a transverse length and a longitudinal length respectively of the standard form,

(f) indicia formed along the length of each of said line scale and said character scale and respectively defining line locations and character locations on said respective scales,



(g) said attachment means and said first and second connectors cooperatively disposed relative to the standard form and said respective scales to allow relative movement of each scale to one another and to the standard form,

(h) whereby service locations on the standard form may be identified by coordinate indicia on both said line scale and said character scale and referenced to equivalent locations of a displayed form.

4,503,616

PARALLEL MOTION DISPLACEMENT TRANSDUCERS

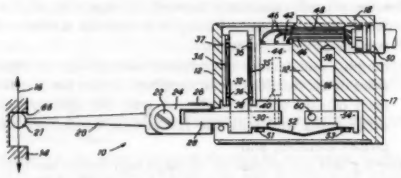
Roger J. Pullen, Bognor Regis, England, assignor to Schlumberger Electronics (U.K.), Ltd., Farnborough-Hampshire, England

Filed May 6, 1982, Ser. No. 375,521

Claims priority, application United Kingdom, May 12, 1981, 8114378

Int. Cl.³ G01B 7/02

U.S. Cl. 33—172 E **9 Claims**



1. A parallel motion displacement transducer for sensing the position or displacement of an object, the transducer comprising:

a housing;

an elongate movable probe member having one end disposed outside the housing and adapted to contact and be moved in a direction transverse to its length by the object;

a parallel motion member connected to the other end of the

probe member and supported by a linear rolling-element bearing disposed within the housing, said bearing having a longitudinal axis, and said parallel motion member constrained by said bearing to move parallel to said axis and thus parallel to the line along which said one end of the probe member is moved by the object;

displacement sensing means disposed within the housing for sensing the position or displacement of the parallel motion member;

a leaf spring coupled between the housing and the parallel motion member so as to bias the parallel motion member in one direction along the axis of said bearing while substantially preventing it from rotating about said axis; and

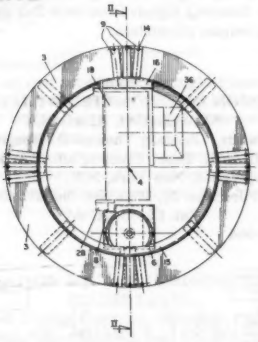
means, coupled to the leaf spring, for adjusting the magnitude and direction of the biassing force produced by the leaf spring.

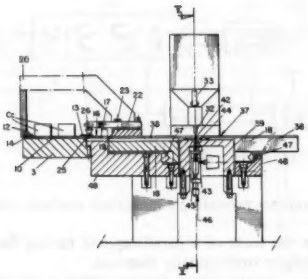
4,503,617

AUTOMATIC GAGE MEASURING MACHINE

René R. Chevrier, 13, les Prés de l'Eglise, Pompignac 33730 Tresses, and Bernard B. Schatz, 11, rue des Mimosas, 91470 Limours, both of France

Filed Mar. 11, 1983, Ser. No. 474,476
Claims priority, application France, Jan. 24, 1983, 83 45002
Int. Cl.³ G01B *7/28*
U.S. Cl. 33—174 L **9 Claims**





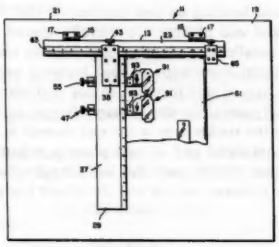
1. An automatic gage measuring machine comprising carrousel means for storing and delivering standard gages and gages to be tested and comprising a flat circular ring mounted for rotational movement on a support frame about a vertical axis, means for intermittently driving said carrousel ring about said vertical axis, a measuring station located inside said carrousel ring and comprising means for measuring the thickness of said gages and comprising two opposed sensing members having probes disposed on the respective sides of the general plane of said carrousel ring and defining a measuring axis, probe displacement means for effecting relative vertical displacement of said probes into contact with opposed sides of a said gage in position along said measuring axis, transfer means for transferring flatwise at least one pair of gages consisting of one of said standard gages and one of said gages to be tested, by horizontal translation substantially in the general plane of said carrousel ring from said carrousel ring to said measuring station and back to said carrousel ring after measuring said pair of gages, positioning means for horizontal translation of said pair of gages in said general plane of said carrousel ring to said measuring axis, means for recording measurements taken by said measuring means and means for controlling and synchronizing movements of said carrousel means, said transfer means, said positioning means and said probe displacement means for sequential measurement of all of said gages to be tested on said carrousel ring.

4,503,618

PLAQUE ALIGNMENT TOOL

Roland C. Eberhardt, 564 W. 39th St., San Pedro, Calif. 90731

Filed Sep. 30, 1982, Ser. No. 431,041
Int. Cl.³ G01B *5/00*
U.S. Cl. 33—180 R **7 Claims**



1. A plaque alignment tool for aligning plates on a plaque board, and the like, the tool comprising:

an elongated guide member fixedly mountable on a planar base member and having an elongated stationary portion and an elongated pivotal portion, the pivotal axis being parallel to the longitudinal axis of said guide member; an elongated arm member movably attachable along the length of said pivotal portion of said guide member while maintaining an orthogonal relationship between its longitudinal axis and that of said guide member;

a plurality of elongated plate-holding finger members each independently movably attachable along the length of said arm member while maintaining an orthogonal relationship between its longitudinal axis and that of said arm member; and

a plate stop member movably attachable along the length of said pivotal portion of said guide member.

4,503,619

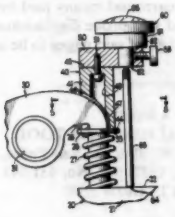
INJECTOR HEIGHT MEASURING TOOL ASSEMBLY

Richard C. Nelsen, Franksville; Alfred A. Wridt, Racine, and John E. Fuhreck, Kenosha, all of Wis., assignors to Snap-on Tools Corporation, Kenosha, Wis.

Filed Jun. 22, 1983, Ser. No. 506,810
Int. Cl.³ G01B *5/14*; G01M *15/00*
U.S. Cl. 33—181 AT **8 Claims**

1. An injector height measuring tool for use with an internal combustion engine including a fuel injector having a follower with a planar follower surface, the fuel injector being carried by a fuel injector body having a planar body surface substantially parallel to and spaced downwardly from the planar follower surface, and a pivotally mounted rocker arm having one end engaging the planar follower surface, said injector

height measuring tool comprising: a generally cylindrical magnetic member having a generally cylindrical side surface and a planar end surface, said member having a slot therein extending from said planar end surface through said cylindrical side surface and having a size slightly greater than that of the rocker arm, the area of said planar end surface being slightly less than that portion of the planar follower surface not engaged by the pivotally mounted rocker arm, a dial micrometer gauge having a housing and an outwardly biased plunger extending therefrom and a dial carried thereby, and means for



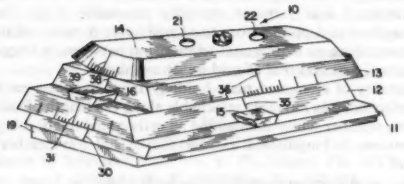
holding said housing on said member so that the axes of said member and said plunger are laterally spaced apart and substantially parallel to each other, said holding means accommodating pivotal movement of said housing and said plunger about the axis of said member, in use said planar end surface magnetically engaging the planar follower surface while the portion of the rocker arm at the end thereof is located in said slot and said distal end of said plunger engaging the planar body surface, whereby said dial indicates the distance between the planar follower surface and the planar body surface.

4,503,620

AXIS ALIGNMENT GAUGE

Roy T. Hinkemeyer, Clear Water, Minn., assignor to The Vision-Ease Corporation, St. Cloud, Minn.

Filed Aug. 19, 1983, Ser. No. 524,600
Int. Cl.³ G01B 5/00
U.S. Cl. 33—185 R **8 Claims**



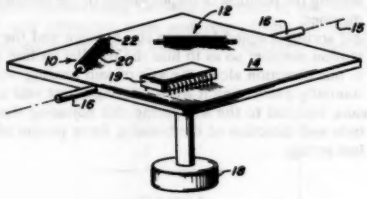
1. An apparatus for determining alignment of the axis of the drive pins on a cylinder machine comprising:
- a set of members located in a stacked relationship;
- a base member for mounting in a cylinder machine lap adapter;
- a first member, said first member slidable on said base member in a first direction with respect to said base member;
- a second member slidably displaceable in a second direction on said first member with respect to said first member; and
- a third member located on said second member and rotationally displaceable with respect to said second member, said second member and said third member having means thereon for determining displacement of said member related to one another, said third member having means thereon for engagement of the drive pins of a cylinder machine.

4,503,621

SOLID STATE COMPASS

John T. Fowler, Marblehead, Mass., assignor to The Laitram Corporation, New Orleans, La.

Filed Dec. 8, 1982, Ser. No. 447,778
Int. Cl.³ G01C 17/30
U.S. Cl. 33—361 **13 Claims**



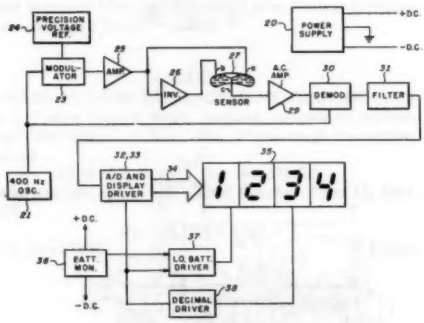
1. A solid state magnetic compass comprising:
- a movable platform having a plurality of flux gates in mutually orthogonal disposition;
- means for movably suspending the platform in a substantially horizontal orientation;
- means for energizing each flux gate only one at a time; and
- means for detecting signals from each flux gate representative of compass orientation.

4,503,622

PRECISION INCLINOMETER WITH DIGITAL NUMERICAL READOUT

Harold L. Swartz, Glendale; Thomas R. Hoogervorst, Scottsdale, and Lynn R. Lane, Phoenix, all of Ariz., assignors to Sperry Corporation, New York, N.Y.

Filed Apr. 20, 1983, Ser. No. 486,631
Int. Cl.³ G01C 9/06
U.S. Cl. 33—366 **15 Claims**



1. An inclinometer providing a numerical readout, comprising:
- a housing in the form of a parallelepiped having first and second surfaces orthogonally disposed,
- passive power supply means for providing a plurality of essentially constant equivalue output voltages of opposing polarity from a single source potential,
- sensor means mounted to said housing, responsive to the influence of terrestrial gravitational force and disposed for gravity responsive output as a function of orientation of at least one of said surfaces relative to a reference axis,
- amplitude stabilized alternating current signal means non-inductively coupled to said sensor means for energizing said sensor means to provide a signal representing the sense and magnitude of inclination of said sensor with respect to said reference axis,

detector means synchronously coupled to said alternating current signal means and said sensor means for providing a signal coincident in phase with said alternating current signal means when said sensor means is inclined with respect to said reference axis, and

numerical indicator means, coupled to said detector means for providing a numerical output proportional to said inclination when said inclination is within a predetermined angular range, and for blanking said numerical output when said angular range is exceeded.

4,503,623

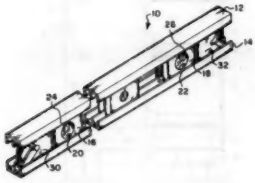
LEVEL

Edward Gould, Jr., 116 Maple Ave., Woodlynne, N.J. 08107

Filed Dec. 14, 1979, Ser. No. 103,722

Int. Cl.³ G01C 9/24

U.S. Cl. 33—379 **6 Claims**



1. A level comprising:

a pair of elongated substantially straight frame members;

a plurality of blocks, each of said blocks carrying a spirit vial, said blocks being positioned between said pair of frame members, and

a plurality of springs extending between said frame members for preventing movement of said frame members relative to each other to thereby maintain said blocks there between.

4,503,624

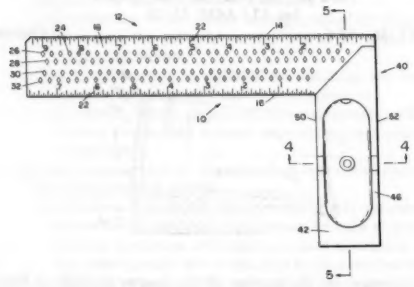
COMBINATION SQUARE, SCRIBING TOOL AND PLUMB LEVEL

Carl Whiteford, 3 High Point Rd., Westport, Conn. 06880

Filed Apr. 14, 1983, Ser. No. 485,113

Int. Cl.³ G01C 9/24

U.S. Cl. 33—451 **2 Claims**



1. A combination square, scribing tool, plumb and level comprising

A. an elongate rectangular blade member having a pair of opposed, parallel longitudinal edges and a pair of opposed parallel faces, at least one of said faces having spaced apart markings thereon along at least one of said longitudinal edes, said markings defining increments of linear measurement, and

B. an elongate handle member connected to said blade member at one end thereof, said handle member having

(1) a pair of opposed parallel longitudinal edges each disposed at a 90° angle to said longitudinal edge of said blade, and

(2) a bubble type liquid level contained within said handle between said longitudinal edges, and

(3) a pair of similarly shaped shells formed of a clear, transparent plastic material, said shells, when joined together, defining an elongate sealed cavity which extends for a major portion of the length and width of said handle member, said cavity being almost entirely filled with a liquid except for a relatively small bubble which is visible through the plastic material, and

C. wherein each of said plastic shells comprise

(1) a relatively narrow other frame portion, the outer longitudinal surfaces of which define said longitudinal edges and the inner longitudinal surfaces of which are curved very slightly so as to be concave, and

(2) an inner relatively wide body portion which defines part of said cavity, each of said body portions having inner and outer curved surfaces which are concave and convex respectively along both the longitudinal and lateral axes of said shells, whereby said handle member functions as a level when the handle member portion rests upon one of said longitudinal edges and functions as a plumb indicator when the blade is held against a vertical surface.

4,503,625

TANK SYSTEM FOR COLD FIXING A TONER POWDER

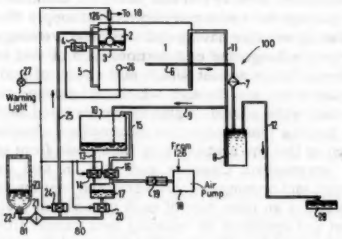
Hans Manzer, Seefeld, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Aug. 16, 1983, Ser. No. 523,608

Claims priority, application Fed. Rep. of Germany, Aug. 31, 1982, 3232369

Int. Cl.³ F26B 21/06

U.S. Cl. 34—78 **10 Claims**



1. In a tank system for cold fixing a toner powder on a paper as it is conducted through a fixing station of a non-mechanical high speed printing and copying device by exposing the printed paper to an atmosphere enriched with vapors of a fixing agent, said tank system including a fixing station having an injection tank containing the fixing agent and having means for creating a vapor of the agent in the fixing station, means for collecting a condensate of the vapor of the fixing agent and delivering the condensate to recovery means for separating the fixing agent from the collected condensate, and supply means for providing an agent to the injection tank including an exchangeable feed container the improvements comprising the system including a pressure tank having an outlet connected to the supply means, a buffer tank for receiving the agent from the recovery means and being connected to the pressure tank by a valve controlled conduit, pump means for applying an air pressure in the pressure tank to cause a flow of the agent into the supply means and the feed container, and control means for actuating the pump means in response to a sensed low level of the agent in the injection tank.

4,503,626
ARRANGEMENT FOR MANUFACTURING OR TREATING WEB MATERIAL

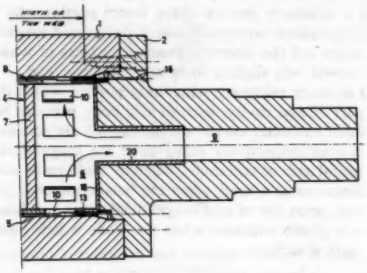
Peter Rothenbacher, and Erich Vomhoff, both of Koenigsbronn, Fed. Rep. of Germany, assignors to Schwabische Hüttenwerke GmbH, Aalen-Wasseralfingen, Fed. Rep. of Germany

Filed Oct. 8, 1982, Ser. No. 433,805

Claims priority, application Fed. Rep. of Germany, Dec. 10, 1981, 3140425

Int. Cl.³ F26B *13/08*

U.S. Cl. 34—110 13 Claims



1. An arrangement for manufacturing or treating a web material, such as a paper machine or a coating machine, comprising a rotary hollow roll having a hollow jacket which has an axis, a central region around which a web material moves, and two axial end regions which are free from the web material; two bearing pins each supporting said jacket in a respective one of said end regions, at least one of said bearing pins having a passage for a heat-carrying fluid; a displacement member located inside said jacket and extending concentrically to said jacket so as to form an annular gap between said displacement member and said jacket and communicating with said passage for a heat-carrying fluid to supply the latter, said displacing member having end walls and a casing with openings and a flange-like end portion, each of said bearing pins having a flange against which said casing of said displacing member abuts and through which said passage also extends, said end walls of said displacing member and said flanges of said bearing pins forming an intermediate chamber therebetween so that the heat-carrying fluid flows from said pin into said intermediate chamber and then in said annular gap through said openings, or vice versa; and heat-insulating means arranged at an inner side of each of said end regions of said jacket and operative for reducing heat transfer from the heat-carrying fluid to said jacket, said heat-insulating means including a ring which blocks a respective one of said end portions of said casing of said displacement member and thereby a respective end portion of said annular gap.

4,503,627
APPARATUS FOR THE TREATMENT OF FLAKY OR GRANULATED MATERIAL WITH GASES OR VAPORS IN A CONTINUOUS COUNTERCURRENT PROCESS

Heinz O. Schumacher, Höperfeld 26, D-2050 Hamburg 80, Fed. Rep. of Germany

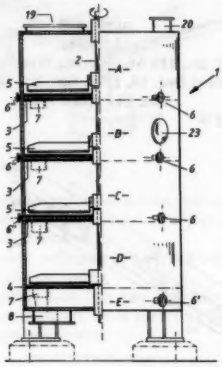
Filed Jul. 20, 1982, Ser. No. 399,995

Claims priority, application Fed. Rep. of Germany, Jul. 20, 1981, 3128596

Int. Cl.³ F26B *17/18*

U.S. Cl. 34—173 20 Claims

1. Apparatus for the treatment of flaky or granulated material with gases or vapors in a continuous operation which comprises: a housing having an inlet at the upper portion thereof for introducing said material and an outlet at the lower portion thereof for removing the treated material, wherein said material falls downwardly by gravity; means for introducing said gases or vapors at the bottom of said housing in countercurrent relationship to said material; at least one perforated plate in said housing defining a treatment stage thereabove having discharge means for discharging said material from said treatment stage and defined by double bottoms having an upper and lower plate and having spacers therein substantially over the entire plate surface and including means for introducing a second vapor therebetween and means for removing said second vapor therefrom, wherein said spacers have a bore



therein forming the perforations in said plate, the cross-section of said bore being substantially annular such that said gas or vapors may pass through said perforations and said material cannot pass through said perforations; a central shaft traversing said housing; agitator means above said perforated plate secured to said central shaft for transmitting horizontal motion to the material in said treatment stage; and a lowermost perforated plate in said housing for uniformly distributing said gases or vapor.

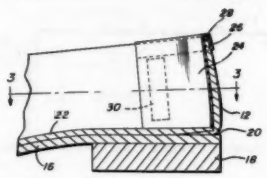
4,503,628
SHOE INSERT

Ralph A. Mancinelli, 2305 Hayes, East Detroit, Mich. 48021, and Anthony R. Mancinelli, 39330 Donahue, Mt. Clemens, Mich. 48044

Filed Jul. 20, 1982, Ser. No. 400,135

Int. Cl.³ A43B *23/28*

U.S. Cl. 36—58.6 3 Claims



1. An insert for the interior of the quarter portion or heel engaging area of a shoe upper for stiffening the shoe upper and facilitating insertion of a foot into the shoe without the use of a shoe horn and the like, said insert comprising a thin sheet member having a U-shaped horizontal cross-sectional configuration and a vertical dimension generally equal to the heighth of a quarter portion of a shoe upper and means securing the sheet member contiguous with the inner surface of the quarter portion of the shoe for stiffening the quarter portion of the shoe upper, said securing means including an outwardly and downwardly turned top edge on said sheet member to receive the top edge of the quarter portion of a shoe upper to rigidify the

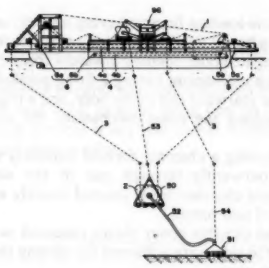
top edge of the shoe upper and provide a smooth surface to facilitate movement of the heel portion of the foot into the shoe, said sheet member being constructed of stiff but flexible plastic material and being of one piece construction, said securing means also including a double faced adhesive strip on both outer side surfaces of said plastic sheet member, said sheet member including a lower edge with spaced parallel lines indicating lines of severance for varying the height of the insert to fit different sizes of shoes.

4,503,629

SYSTEM FOR COLLECTING AND CONVEYING UNDERSEA MINERAL RESOURCES

Masaaki Uchida, 4-13-12 Morishita, Koto-ku, Tokyo, Japan

Filed Jan. 23, 1984, Ser. No. 572,915
Int. Cl.³ E02F *7/00, 3/88*
U.S. Cl. 37—57 **3 Claims**



1. A system for collecting mineral resources on the seabed of an ocean floor, comprising:

an automotive collector for gathering mineral resources on the seabed,

said automotive collector being movable on the seabed by a remote control from a ship, said automotive collector having first pump means for sucking mineral deposits on the seabed, and

second pump means for transporting the sucked mineral deposits,

a collection vessel means, connected to said automotive collector through a tube, for collecting mineral resources gathered by said automotive collector,

said collection vessel means having a vessel for temporarily storing the gathered mineral resources, and a wheel within said vessel,

said wheel having an agitator for agitating the mineral deposits fed from said automotive collector,

said second pump means of the automotive collector feeding the sucked mineral deposits to said collection vessel means,

an endless bucket lift having an endless belt with a number of buckets attached thereto,

said endless bucket lift being continuously movable between said collection vessel means and the ship so that mineral resources collected into said collection vessel are continuously fed to the ship by said endless bucket lift, said wheel of the collection vessel means being rotatable along with a movement of said endless bucket lift, and

an expansion apparatus, provided on the ship, having at least a pair of end rollers,

at least one of said end rollers being movable toward and away from the other end roller of said end rollers, said endless bucket lift being wound on said end rollers so that said endless bucket lift can travel through said end rollers to and from said collection vessel,

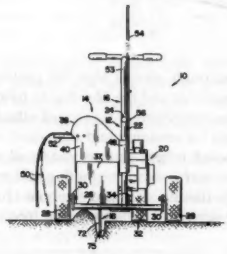
wherein an effective length of said bucket lift lowered from the ship into the seawater is adjusted in accordance with a depth of the seabed by changing the distance between said end rollers.

4,503,630

DITCH DIGGING MACHINE

Terrence H. Riley, P.O. Box 987, Lehigh Acres, Fla. 33936

Filed Sep. 15, 1983, Ser. No. 532,494
Int. Cl.³ E02F *5/08*
U.S. Cl. 37—94 **6 Claims**



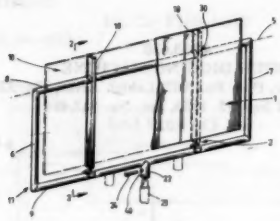
1. A ditch digging machine comprising: a frame including a forward and rear vertical post and a cross bar connecting the upper ends of said vertical posts; wheels supporting the lower ends of said vertical posts; a housing to at least partially enclose a cutting blade assembly; said housing including a convex hood having forward and rear end plates extending downwardly from opposite ends thereof; said forward and rear end plates each having a sleeve attachment thereto to engage said vertical posts, a vertical side shield extending between said opposite end plates, a motor supporting platform extending outwardly from said vertical side shield to support a motor thereon, and adjusting vertical lift means for raising and lowering said housing relative to said frame, a bias means coupled between said motor support platform and said frame means to assist the vertical adjustment of said motor relative to said frame, said motor mounted on said motor support platform having a substantially horizontal motor shaft extending through said vertical side shield, and a flexible safety guard connected to said convex hood opposite said vertical safety shield disposed to deflect excavated debris from said cutting blade assembly against said convex hood, said flexible safety guard comprising a resilient member to at least partially absorb the energy of the excavated debris from said cutting blade assembly, said flexible safety guard operatively supported by an extending member extending outwardly from said convex hood to at least partially enclose one of said forward wheels, the lower edge of said resilient member extending at or below said substantially horizontal motor shaft, said cutting blade assembly rotatably mounted on said substantially horizontal motor shaft substantially parallel to said vertical side shield within said convex hood and said forward and rear end plates; said cutting blade assembly configured to be lowered with said housing for ground engagement to cut a trench therein; said wheels including a pair of forward wheels being rotatably attached to opposite ends of a substantially horizontal axle coupled to a lower portion of said forward vertical post and a rear wheel pivotally coupled to the lower portion of said rear vertical post by a swivel coupling means including a sleeve pivotally attached to the lower portion of said rear vertical post.

4,503,631

BLOW-THROUGH PIVOTAL SIGN

Gerard T. Kelly, 7280 Wynnwood, Ste. 275, Houston, Tex. 77008

Filed Sep. 29, 1982, Ser. No. 426,987
Int. Cl.³ G09F 7/00
U.S. Cl. 40—602 13 Claims



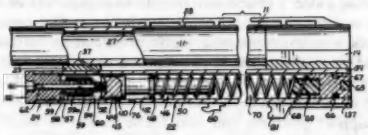
1. A blow-through pivotal sign for preventing damage to advertising structures and the like due to natural forces acting on the signface comprising a signboard attached to a support structure, means for retaining said signboard in a fixed position until a preselected torque due to windload is applied, and a wind responsive retractor for retracting said retaining means to prevent damage thereto after said signboard has been deflected from the fixed position and is swinging freely.

4,503,632

RECOIL REDUCING MECHANISM FOR SHOTGUNS

James W. Cuevas, P.O. Box 1092, Sisters, Oreg. 97759

Filed Aug. 12, 1983, Ser. No. 522,961
Int. Cl.³ F41C 27/00
U.S. Cl. 42—1 V 1 Claim



1. A recoil reducing mechanism for use in shotguns having a barrel with a muzzle end and a breech end, the breech end of the barrel being mounted in a block, comprising:

a tubular cylinder for connection to the shotgun in a position approximately parallel to the barrel; the tubular cylinder having an inside bore, a front end and a breech end, the breech end of the cylinder being connected to the block of the shotgun;

gas passage means interconnecting the barrel and cylinder for allowing explosive gases from the barrel to expand into the cylinder near the front end of the cylinder;

a piston slidably held within the bore of the cylinder, the piston having a relatively close fit therein;

a breech plug mounted at the breech end of the cylinder to close the breech end of the cylinder;

a front plug mounted at the front end of the cylinder, to close the front end of the cylinder; the front plug including a resilient stop means having a resilient housing connected to the front plug, a shroud surrounding the resilient bushing, and a fastener connecting the resilient bushing shroud and front plug together as an assembly; and

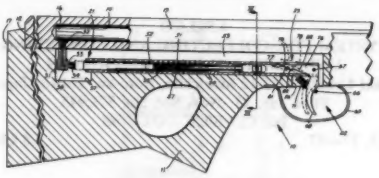
a compression spring between the breech end of the cylinder and the piston for returning the piston toward the front end of the cylinder and into a battery position.

4,503,633

MUZZLE LOADING FIREARM

Clifford Davis, Sherman Township, St. Joseph County, Mich., assignor to Edward D. Jasper, Shipshewana, Ind. and Rolland Bohm, Centreville, Mich.

Filed Feb. 10, 1983, Ser. No. 465,698
Int. Cl.³ F41C 7/00, 19/00
U.S. Cl. 42—51 12 Claims



1. In a muzzle-loading firearm having a stock, an elongated muzzle-loading barrel fixedly mounted on the stock, the barrel having an elongated bore opening inwardly from the front end thereof, a firing mechanism having a firing passage communicating with the rearward end of the bore, and a trigger mechanism for activating the firing mechanism, the improvement comprising:

said stock having a chamber formed interiorly thereof and opening outwardly through one of the side surfaces thereof, said chamber being located directly adjacent the rear end of said barrel;

openable and closable cover means mounted on said stock adjacent the side surface thereof for closing the open end of said chamber;

said firing mechanism including a firing nipple positioned within said chamber and fixed to said barrel adjacent the rearward end thereof, said firing nipple having a firing passage therethrough for communication with the barrel bore adjacent the rearward end thereof, said firing nipple having a mounting portion which is disposed within said chamber and projects forwardly in said firearm, said mounting portion being adapted to mount a detonating cap thereon;

said firing mechanism also including a firing member movably mounted on said stock within the interior thereof and positioned forwardly of said mounting portion, said firing member being spring urged into a rearward position for engagement with the cap mounted on said mounting portion;

said trigger mechanism including a trigger member movably supported on said stock and having a finger-engaging part which projects outwardly of said stock, said trigger member being mounted on said stock at a location spaced forwardly a substantial distance from said firing nipple and from the rearward end of said barrel; and

latch means coacting between said firing member and said trigger member for releasably holding the firing member in a forward position wherein it is spaced from the cap.

4,503,634

FISH HOOK

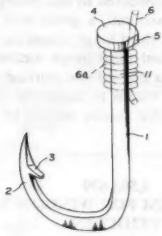
Norio Hamayasu, Sakai, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan

Filed Dec. 2, 1980, Ser. No. 212,033
Claims priority, application Japan, Dec. 25, 1979, 54-181145[U]
Int. Cl.³ A01K 83/00
U.S. Cl. 43—44.83 3 Claims

1. A fishing hook comprising:

a substantially straight stem portion terminating at one end with a flange, sad flange having an unbroken, solid upper surface, said flange surface having an outer periphery extending radially beyond and around the periphery of

said stem portion, said flange surface having a cutout along part of its radial periphery which provides a surface which extends substantially parallel to and is contiguous and level with said stem portion, said cutout reducing wear to a fishing line which passes through said cutout



and is wrapped around said stem portion adjacent said flange; and

a hook member integral with the remaining end of said stem portion, said hook member being bent so that the end of said hook member is opposite to and substantially parallel with said stem portion.

4,503,635

FLYING DISC WITH WEIGHTED OUTER RING

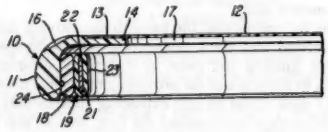
Richard H. Harrington, 631 Third St., Ann Arbor, Mich. 48103

Continuation-in-part of Ser. No. 157,464, May 29, 1980, which is a continuation of Ser. No. 808,593, Jun. 21, 1973, Pat. No. 4,204,357. This application Apr. 1, 1982, Ser. No. 364,432

The portion of the term of this patent subsequent to May 27, 1997, has been disclaimed.

Int. Cl.³ A63H *27/00*

U.S. Cl. 446—46 **9 Claims**



1. A flying disc comprising:

an annular member molded of a first material, the inner perimeter of the annular member defining an open inner area in a plane, and the annular member comprising an outer rim with an air-foil-shaped cross-section curved away from the plane defined by the inner perimeter and having a convex outwardly facing surface, the outer rim having an inwardly facing surface;

a thin, flat sheet of a different material having a higher strength-to-weight ratio for its thickness than the first material at the same thickness and having an outer perimeter affixed to the annular member to cover the open inner area; and

a weight ring comprising an outwardly facing surface, the outwardly facing surface of the weight ring and the inwardly facing surface of the rim comprising interlocking means to hold the weight ring connected to the rim.

4,503,636

POST AND CANTELEVERED RING PLANT/VINE SUPPORT STRUCTURE

William C. Stuckey, 1503 Virginia St. E., Charleston, W. Va. 25311

Filed Aug. 2, 1983, Ser. No. 519,659

Int. Cl.³ A01G *17/06*

U.S. Cl. 47—44 **9 Claims**

1. A tomato plant support of the type having a post for driving into the ground and at least one endless ring plant support wire rod members releasably and lockably supported in cantilever fashion from said post, the improvement comprising,

said post having a U-shaped central portion and a pair of laterally projecting flanges, locking lug means formed in said flanges and opening in an selected vertical direction, a cooperating locking lug formed in said U-shaped portion and opening in a opposite direction,

and a complementary U-shaped member formed in said endless ring plant wire support member, said U-shaped element being adapted, in a single maneuver, to interengage and lock on said locking lug formed in said U-shaped member with contiguous portions of said plant wire support interengaging said locking lug means in said flanges.

4,503,637

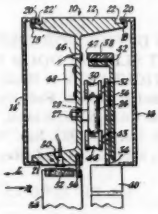
SLIDING DOOR SYSTEM

Jerry Parente, 2061 SW. 136 Ave., Davie, Fla. 33325

Filed Jul. 6, 1982, Ser. No. 395,842

Int. Cl.³ E05B *65/10*; E05C *7/06*

U.S. Cl. 49—141 **12 Claims**



1. An automatic door assembly for a building entrance opening, comprising:

a support header means;

a support means connected horizontally to the building entrance opening for supporting and enclosing the components of the automatic door assembly;

a door assembly means connected to the support header means for suspending, supporting and guiding a door means;

a drive means connected to the door assembly means for propelling the door assembly means; and

a control means connected to the drive means for regulating the drive means;

said door assembly means includes a linear track means connected horizonatally to the support header means by a plurality of adjustable attachment means for supporting a

door carrier means, said adjustable attachment means is a fastener means connected to a vertically disposed elongated aperture in the support header means, said adjustable attachment means connected to the linear track means for varying the vertical displacement of the linear track means on the support header means by vertical displacement of the fastening means within the vertically disposed apertures in the support beam;

a door carrier means vertically disposed connected to the linear track means by a plurality of sliding means for supporting a sliding door from the linear track means, said sliding door connected to the door carrier means by a safety hinge means;

said sliding means connected to the door carrier means for allowing travel of the door carrier means along the length of the linear track means;

an angle iron means connected to the door carrier means for attaching to a drive belt means for propelling the door carrier means along the linear track means;

means connected to the angle iron for affixing a drive belt means to said angle iron and for mounting magnetic sensing tapes;

a fixed door connected to said support header means;

a fixed door stop plate means connected to said support header means for preventing movement of the fixed door in a specific direction, a fixed door magnet means connected to the fixed door for magnetically contacting with the fixed door stop plate means to prevent movement of the fixed door in a specific direction unless sufficient force is applied to break the magnetic contact;

at least one sliding door guide means connected to the bottom of the sliding door for guiding and restraining the movement of the sliding door during movement along the support beam header means;

a fixed door rotatable safety hinge means connecting the fixed door to the support header means and floor of the building entrance opeing for allowing rotation of the fixed door horizontally about a vertical axis in a specific direction upon application of pressure against the fixed door;

a sliding door rotatable safety hinge means connecting the sliding door to the door carrier means and sliding door guide means for allowing rotation of the sliding door horizontally about a vertical axis in a specific direction upon an application of pressure against the sliding door.

4,503,638

SUSPENSION DEVICE FOR THE DOOR LEAF OF A SWING-OUT SLIDING DOOR FOR A VEHICLE, PARTICULARLY A RAIL VEHICLE

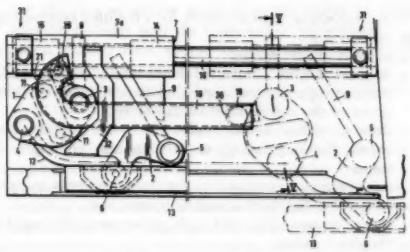
Manfred Schindehutte, Calden, Fed. Rep. of Germany, assignor to Gebr. Bode & Co. GmbH, Kassel, Fed. Rep. of Germany

Filed Jul. 27, 1983, Ser. No. 517,788

Claims priority, application Fed. Rep. of Germany, Aug. 21, 1982, 3231181

Int. Cl.³ E05D *15/10*

U.S. Cl. 49—213 **10 Claims**



1. A suspension device for a door leaf of a swing out sliding door of a vehicle, said suspension device comprising a horizontal, fixed suspending member, a frame movable along said fixed suspending member, a swing arm connected to said frame for movement therewith, a first hinge means pivotably connecting said swing arm and said frame, means including a second hinge means pivotably connecting a door leaf to said swing arm, a fixed rail, roller means connected to said swing arm and rollably supported in said fixed rail, a guide arm pivotably connected to the door leaf, a third hinge means on said guide arm, and means connecting said third hinge means to said frame, said fixed rail including a curved end portion which controls movement of said roller means to cause the door leaf to displace radially as the roller means travels to and from said curved end portion.

4,503,639

GUIDANCE SYSTEM FOR WINDOW PANES OF VEHICLES

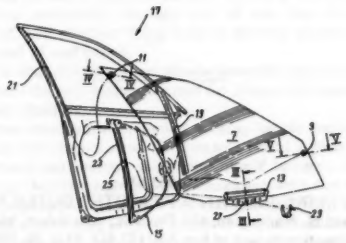
Egbert Rossie, Ingolstadt, and Klaus Feucht, Gaimersheim, both of Fed. Rep. of Germany, assignors to Audi NSU Auto Union AG., Ingolstadt, Fed. Rep. of Germany

Filed Mar. 10, 1983, Ser. No. 474,051

Claims priority, application Fed. Rep. of Germany, Mar. 13, 1982, 3209206

Int. Cl.³ E05F *11/38*

U.S. Cl. 49—374 **12 Claims**



1. An apparatus for guiding a window pane of a vehicle between open and closed positions, comprising:

means for movably supporting the pane;

means for moving the pane between the open and closed positions;

first and second means for connecting the pane the the supporting means; and

third means for connecting the pane to the moving means;

the first, second and third connecting means comprising means for guiding the pane in directions substantially normal to its surface and for providing rotational movability to the pane about an axis extending substantially normal to the surface surrounding the first, second and third connecting means, the first and third connecting means further comprising means for guiding the pane in directions substantially parallel to its surface and normal to its direction of movement between the open and closed positions, the third means comprising means for guiding the pane in the direction of its movement between the open and closed positions, and the second means comprising means for guiding the pane solely in directions substantially normal to the surface of the pane.

4,503,640

UNITIZED CONSTRUCTION FOR SLIDING CLOSURES AND METHOD FOR MAKING

Melvin J. Stern, 940 Douglas Ave., Longwood, Fla. 32750

Filed Mar. 17, 1983, Ser. No. 476,198

Int. Cl.³ E05D *13/02*

U.S. Cl. 49—425 **14 Claims**

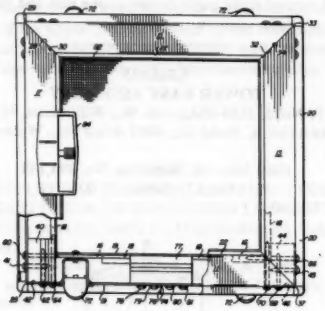
1. A method for making a rigid, unitized construction for a

sliding door, window or other closure from a length of aluminum channel material, said method comprising the steps of:

(a) forming a lateral mitered slot in said channel, leaving an outer web between the sides of said slot;

(b) bending said channel laterally along said web so that one side of said slot abuts the other side thereof;

(c) extending a corner lock through said channel and bridging said slot;



(d) forming an expander in said corner lock, said expander adapted to receive a fastener so as to expand outwardly and lock said corner lock within said channel;

(e) extending a first fastener laterally through one side of said channel and through said expander of said corner lock, and transverse to the plane of said slot; and

(f) extending a second fastener through another side of said channel transverse to said slot and through said corner lock and substantially normal to said first fastener.

4,503,641

SHALLOW DOUBLE HUNG WINDOW

Charles A. Swan, Seminole, Fla., assignor to Windows, Inc., Largo, Fla.

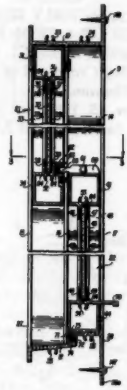
Continuation of Ser. No. 217,987, Dec. 18, 1980, , which is a continuation-in-part of Ser. No. 216,813, Dec. 16, 1980, abandoned, which is a continuation of Ser. No. 923,344, Jul. 10, 1978, Pat. No. 4,238,907, which is a continuation-in-part of Ser. No. 758,866, Jul. 10, 1978, abandoned. This application May 23, 1983, Ser. No. 496,937

The portion of the term of this patent subsequent to Dec. 20, 2000, has been disclaimed.

Int. Cl.³ E05D *13/10*

U.S. Cl. 49—445 **8 Claims**

1. A pair of block and tackle sash balances in combination with a double hung window not greater than about two inches in overall thickness between its outer and inner frame surfaces, each balance comprising a rod having a U-shaped cross section, a tension spring extending within said rod connected to one end thereof, a block and tackle mechanism within said rod connected to the other end of said spring, a cable of said block and tackle mechanism extending from the outer end of said rod, the window comprising a jamb with a pair of inward grooves and a corresponding pair of outward grooves each defined by U-shaped sides provided side-by-side in said jamb, a coplanar perimeter part having means for connecting to a building structure, said perimeter part being integral with and extending outwardly relative to the remainder of said jamb, a pair of window panels each with a stile having a U-shaped cross section on one vertical side thereof, the legs of each said stile received in a corresponding said interior groove defining a longitudinal space having a substantially rectangular cross section, each said stile defining an outwardly facing longitudinal groove at the outer end of each said leg thereof, a pile sealing strip received along the entire length of each said longitudinal groove, each said pile strip bearing against a corresponding side of an interior grove in said jamb whereby each said space is sealed, a said balance received in each said inward groove and having said cable affixed thereto whereby each said balance is urged upwardly, a headpiece attached to the top of each said stile, a stop member mounted on top of each said rod, said stop member having an inclined surface adapted to cooperate with a mating inclined surface provided on said headpiece whereby the urging of said stop member against said



headpiece urges said window panel in a lateral direction away from the corresponding said inward groove, said window being for installation on a framework of a porch or room wherein the thickness of the opening provided therein for said window's thickness and said window when installed overlap by a distance of not greater than about two inches, and means being provided on said perimeter part for receiving a panel.

4,503,642

BELT GRINDER FOR CHIP BOARD AND THE LIKE

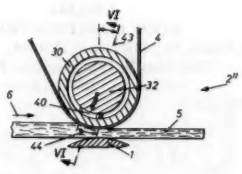
Friedrich Wilms, Krefeld, Fed. Rep. of Germany, assignor to Eduard Küsters, Krefeld, Fed. Rep. of Germany

Filed May 4, 1983, Ser. No. 491,277

Claims priority, application Fed. Rep. of Germany, May 13, 1982, 3217935

Int. Cl.³ B24B *21/00*

U.S. Cl. 51—139 **4 Claims**



1. In a belt grinder for a chip board and the like including: an endless grinding belt which revolves in a longitudinal plane perpendicular to a feed direction for the board and extends over the width of the board; a pressure roll extending over the width of the board; a counter pressure element parallel to the pressure roll, the pressure roll and counter pressure element defining a grinding gap through which the grinding belt is conducted; and a feeding device for the board advancing the board in the feed direction, the improvement comprising: the pressure roll being a deflection controlled roll including: a fixed, rotation-proof cross head; a hollow cylinder supported on said cross head at each end by bearings, such that said cylinder is spaced from said cross head; means for applying a

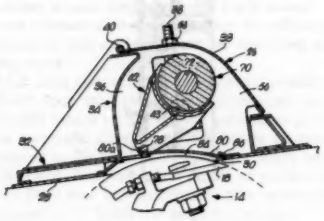
force between said cross head and said cylinder in an action plane oriented in a direction toward said grinding gap, thereby causing said hollow cylinder to be braced against said cross head from the inside, whereby a uniform line pressure or uniform height of grinding can be maintained to give high tolerances with a pressure roll of relatively small diameter.

4,503,643

SHARPENER ASSEMBLY FOR THE CUTTING CYLINDER OF A CROP HARVESTER

John F. Johnson, Wichita; Richard J. Buller, Newton, and Ronald K. Guinn, Valley Center, all of Kans., assignors to Hesston Corporation, Hesston, Kans.

Filed Nov. 15, 1982, Ser. No. 418,438
Int. Cl.³ B24B *3/55*
U.S. Cl. 51—247 **12 Claims**



1. In combination with the rotary cutting cylinder of a crop harvester, a sharpener for the peripherally located knives of said cylinder comprising:

an elongated abrasive member of substantially the same length as the cylinder and extending generally along side of the latter;

means mounting said member for selective transverse movement into the path of travel of said knives for sharpening the full lengths of the latter without shifting the member axially of the cylinder; and

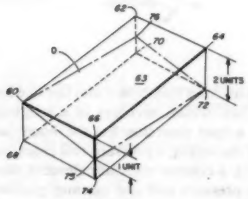
apparatus operably associated with said member for positioning the same progressively closer to the cylinder after each predetermined number of said transverse movements of the member whereby to accommodate reduction in the diameter of the cylinder due to wear in the knives from sharpening by the member.

4,503,644

ROOF CONSTRUCTION

Walter H. Coutu, Sr., 110 Nagog Hill Rd., Acton, Mass. 01720

Filed May 9, 1983, Ser. No. 493,005
Int. Cl.³ E04D *13/00*
U.S. Cl. 52—13 **4 Claims**



1. A construction block having a base, at least one top surface which slopes toward the base and at least two sides characterized by:

a. a first right angle corner of finite thickness defined by the intersection of the two sides;

b. two diametrically opposite corners of equal thickness each of which lies in the plane of a separate side;

c. a second right angle corner diametrically opposite the first corner; and

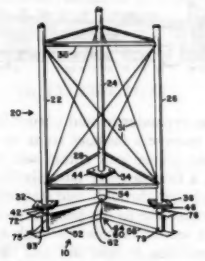
d. wherein the thickness of the diametrically opposite corners is a finite number of units each and the thickness of the right angle corner of finite thickness is one unit greater than that of the opposite corners and the thickness of the said second right angle corner is one unit less than that of the opposite corners.

4,503,645

TOWER BASE ASSEMBLY

Conrad T. Nudd, 3185 Ridge Rd. W., Williamson, N.Y. 14589, and Frederick A. Nudd, Jr., 4897 Arbor Rd., Walworth, N.Y. 14568

Filed May 10, 1983, Ser. No. 493,148
Int. Cl.³ E04H *12/00*
U.S. Cl. 52—40 **22 Claims**



1. A draining transition arm assembly for supporting a tower having one or more vertically-oriented tubular legs comprising:

a central hub;

a plurality of generally horizontal arms extending radially outward from said central hub;

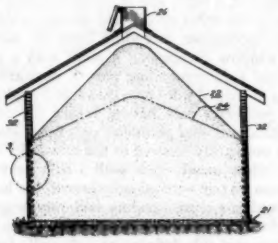
a drainage assembly on each arm, each assembly including a substantially vertically-oriented tube open at both ends and extending substantially through and attached to said arm; and means at the upper end of each tube for attaching said tubular legs to said drainage assembly.

4,503,646

BULK STORAGE BUILDING STRUCTURE

Henry E. Lowe, 201 N. Edwards St., Cassopolis, Mich. 49031

Filed May 31, 1983, Ser. No. 499,303
Int. Cl.³ E04H *7/34*
U.S. Cl. 52—198 **13 Claims**



1. A bulk storage building structure mounted on a base and having a filler portal near the top, comprising a plurality of generally vertical frame members extending upwardly from

said base and spaced apart at predetermined intervals, and a plurality of slat-like wall members disposed substantially horizontally in both the radial and peripheral directions in the building structure and having relatively broad, substantially flat upper surfaces for supporting stored materials, said wall members being connected to said vertical members and spaced apart at substantially regular intervals, the vertical spacing between said wall members being determined by the angle of repose of the materials to be stored in said structure such that the plane of the upper surface formed by the bulk materials on the angle of repose between two adjacent wall members intersects said upper surface inwardly from the outer edge thereof.

4,503,647

STRUCTURAL BUILDING ELEMENTS FOR CONSTRUCTION OF SIMULATED LOG HOUSES

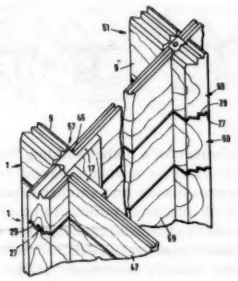
Gerhard Post, Im Alten Dorfe 24, 2106 Bendestorf, Fed. Rep. of Germany

Filed Jan. 27, 1983, Ser. No. 461,550

Claims priority, application Fed. Rep. of Germany, Feb. 4, 1982, 3203684

Int. Cl.³ E04B *1/10*

U.S. Cl. 52—233 **5 Claims**



1. A structural corner support element for a log house or the like which comprises wall boards placed upon each other and forming the walls of the house, and crossed corner support elements stocked upon one another forming the corners of the house, each corner support element consisting of a free-ended, projecting head piece and an inwardly disposed joint member are formed with such a profile that crossing corner support elements define grooves for accomodating inserted wall boards of smaller thickness, the improvement wherein each of said corner support elements comprising a heart quoin, a head piece and a guide strap with complimentary longitudinally extending mortise and tenon profiles on the upper and lower surfaces of each of said head piece and said guide strap, said head piece and said guide strap being equal in height and said heart quoin having a height not greater than half the height of said headpiece, said guide strap having one vertical face contiguous with a first face of said heart quoin and a thickness less than that of said heart quoin, said head piece having one vertical face contiguous with the opposite face of said heart quoin and projecting laterally beyond the first face of said heart quoin, whereby when a plurality of corner support elements are disposed in topwise cogging relationship and crosswise interfitting engagement to form joint assemblies the joint assemblies are in positive interdigitating engagement with joint assemblies disposed thereabove and therebeneath, providing straight slide-in grooves between the head pieces and the guide straps, the guide straps forming an inwardly disposed large-area engagement and abutting surface for the ends of the wall boards.

4,503,648

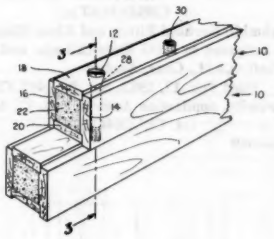
LIGHTWEIGHT COMPOSITE BUILDING MODULE

Donald H. Mahaffey, 805 Sycamore St., Decatur, Ga. 30030

Filed Dec. 9, 1982, Ser. No. 448,368

Int. Cl.³ E04C *3/10*

U.S. Cl. 52—227 **6 Claims**



1. A lightweight composite building structure comprising:

a plurality of correspondingly-shaped modules stacked one above another, producing a wall for a building,

each of said modules including,

(i) a pair of spaced elongated wooden side walls having inner and outer corners joined by a wooden top and a bottom wall defining an elongated cavity;

(ii) urethane foam filling said elongated cavity;

(iii) said inner corners of said pair of spaced elongated side walls having recesses provided thereon forming ledges upon which said top and bottom walls rest;

(iv) said wooden top being nested between the recesses of said side walls of another module stacked thereon; and

a fastening device extending between said stacked modules drawing said modules tightly together under compression with said ledges in said side walls absorbing said compressive force producing a lightweight wall structure.

4,503,649

MODULAR BLOCK STRUCTURES FOR BREAKWATERS, HARBOR DAMS AND THE LIKE

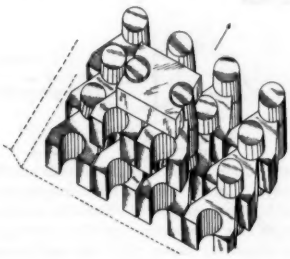
Joseph Sciortino, No. 42, Via S. Antonio da Padova, Rome, Italy

Filed May 7, 1982, Ser. No. 376,052

Claims priority, application Italy, May 14, 1981, 48473 A/81

Int. Cl.³ E04C *1/10*; E02B *3/12*

U.S. Cl. 52—593 **11 Claims**



1. A construction comprising modular blocks and having a controllable pervious structure, particularly adapted for breakwaters, harbour dams and the like, wherein said blocks are prefabricated by casting a cement concrete, characterized in that it comprises two fundamental elements: a male element having a substantially cylindrical body and a wing, said wing having a height which is less than the height of said cylindrical body and being provided with an opened cavity or recess embracing the cylindrical element of similar blocks; a second

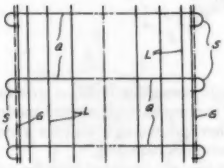
substantially female parallelepiped shaped element having two open cavities or recesses each embracing a cylindrical body of a said male element for enchaining the male elements in the whole construction.

4,503,650

GRID MAT

Gerhard Schmidt; Gerhard Ritter, and Klaus Ritter, all of Graz, Austria, assignors to EVG Entwicklungs- und Verwertungs-Gesellschaft m.b.H., Graz, Austria

Filed Feb. 17, 1983, Ser. No. 467,379
Claims priority, application Austria, Feb. 17, 1982, 609/82
Int. Cl.³ E04C *2/42*
U.S. Cl. 52—660 **6 Claims**



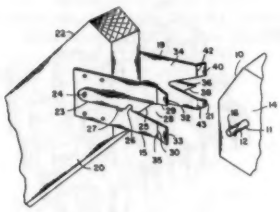
1. A grid mat comprising substantially straight longitudinal wires and substantially straight transverse wires, welded to one another at their intersections, in which two substantially parallel planes are defined by the axes of said longitudinal and said transverse wires, respectively, and in which at least some of said transverse wires project beyond edge ones of said longitudinal wires and are bent back to said edge longitudinal wires in the form of loops, each of said loops having curved parts defining an arch portion having a tangent parallel to said longitudinal wires, wherein at least said curved parts of said loops are bent out of said transverse wire plane in the direction of said longitudinal wire plane such that said arch portions of said loops lie between said transverse wire plane and said longitudinal wire plane.

4,503,651

RIDGE LATCH PLATE AND COOPERATING LATCH PIN

John B. Pugh, 3016 Graham La., Tampa, Fla. 33618

Filed Jun. 14, 1982, Ser. No. 388,481
Int. Cl.³ E04B *1/32*
U.S. Cl. 52—639 **9 Claims**



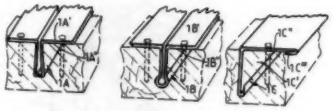
1. A device for interconnecting two beams of a constructional arch, comprising in combination:
- a latch pin having a first and a second end;
- said latch pin extending through a first of said beams;
- each of said ends protruding from an opposite side of said first beam;
- a first and a second latch plate being disposed respectively in a first and a second plane, said planes being parallel relative to each other, said latch plates cooperating with said latch pin;
- means for securing each of said first and second latch plates adjacent an opposite side of a second of said beams;
- a first and a second latch pivotably mounted on said first and second latch plates respectively, distal ends of said first and said second latches engaging said first and said second ends of said latch pins respectively;
- a first and a second flared portion of said first and said second latch plates respectively for guiding said first beam between said latch plates, said portions being divergently flared relative to each other, said portions diverging from the respective planes of said plates; and
- a first and second guide defined by said first and said second latch plates respectively for guiding said first and said second ends respectively of said latch pin towards the distal ends of said first and said second latches respectively for rigidly securing said beams together.

4,503,652

BRACING ELEMENT

Arthur R. Turner, 69 Terranora Rd., Banora Point, Near Tweed Heads, New South Wales, Australia

Filed Sep. 13, 1982, Ser. No. 417,181
Claims priority, application New Zealand, Oct. 21, 1981, 198727
Int. Cl.³ E04C *3/292*
U.S. Cl. 52—657 **5 Claims**



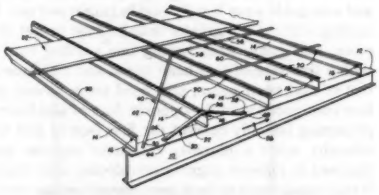
1. A bracing element for a timber building frame comprising a pair of nailable elongate members having respective open cross-sections approximating one another capable of resisting axial loading in both directions sufficient to stabilize the timber building frame, one of said members being accommodated and retained in a slidable nested relationship with the other of said members whereby relative movement of the said members extends or contracts the length of the bracing element during installation to suit the plumbing or squaring of the timber frame.

4,503,653

STRUCTURAL BRACING SYSTEM

Harold G. Simpson, Oklahoma City, Okla., assignor to Encon Products, Inc., Oklahoma City, Okla.

Continuation-in-part of Ser. No. 306,662, Sep. 29, 1981, , which is a continuation-in-part of Ser. No. 93,173, Nov. 3, 1979, Pat. No. 4,329,823. This application Sep. 30, 1982, Ser. No. 428,459
Int. Cl.³ E04C *2/42*
U.S. Cl. 52—664 **15 Claims**



1. A building assembly having a roof formed thereon comprising:
- a primary structure;
- a plurality of substantially parallel and spaced apart second-

ary structural members supported by the primary structure;

at least one tertiary support means for connecting the roof to one of the secondary structural members; and

first bracing means interconnecting the tertiary support means and the primary structure for increasing the load carrying capacity of the tertiary support means by substantially restricting the translation and rotation of the tertiary support means while permitting other tertiary support means to flex and accommodate the longitudinal movement of the roof within the elastic limit of the other tertiary support means, the first bracing means comprising a load transfer strap interconnecting the selected tertiary support means to at least one adjacently disposed position on the primary structure, the adjacently disposed position being located a selected distance from the tertiary support means.

4,503,654

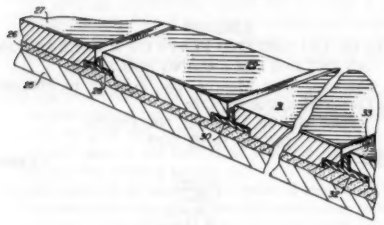
METHOD AND APPARATUS FOR LAYING TILE

Edward Cosentino, P.O. Box 2323, Naples, Fla. 33939

Filed Sep. 24, 1982, Ser. No. 422,649

Int. Cl.³ E04C *21/22*; E04F *13/08*

U.S. Cl. 52—747 **2 Claims**



1. A method of constructing a flat decorative surface from a plurality of similar individual rectangular tiles with an exact predetermined spacing between individual tiles, each tile having a front face intended to form part of said decorative surface and a rear face intended to be bonded to a bed of mortar and four elongated sides lying substantially at 90° to the front and rear faces of the tile, comprising the steps of

forming at least two similar indentations in each of the four sides of the tile with each indentation having a flat upper surface parallel to the front face of the tile and the distance between the flat surface of each indentation and the front face of the tile being exactly the same,

securely affixing to the flat surface of each indentation in two adjoining sides of the tile one-half of a flat surfaced base of a spacer member, each spacer member having a flat surfaced base and a flat sided flange projecting at 90° from the flat surface of said base and the flange having a thickness equal to the predetermined spacing between individual tiles,

positioning one side of the flange of each spacer member against the adjoining side of the tile,

laying one of said tiles onto a bed of wet mortar,

laying a second tile onto said bed of wet mortar so that the flat surfaces of the indentations in its two sides which do not contain spacer members will each rest upon the base of one of the spacer members of the first tile with one side of the second tile resting against the flanges of said spacer members, and

laying successive tiles onto said bed of wet mortar with their indentations which do not contain spacer members resting upon the base of one of the spacer members of an adjacent tile with a side of the tile resting against the flanges of said spacer members.

4,503,655

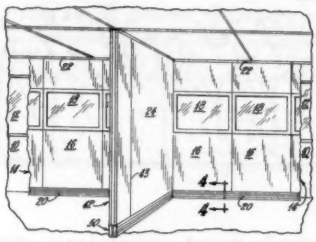
INSULATION SYSTEM FOR INNER SIDE OF EXTERIOR WALL

Raymond W. Yeager, Pataskala, and Alfred Marzocchi, Newark, both of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Sep. 30, 1982, Ser. No. 429,592

Int. Cl.³ E04B *1/80*

U.S. Cl. 52—747 **2 Claims**



1. A method of insulating the inner side of an exterior wall of an existing building, the wall having windows, said method comprising mounting a plurality of thermally insulating sound absorbent panels along the wall, the panels extending substantially from floor to ceiling and having glazed windows in areas corresponding to those where the wall contains windows wherein the panels are secured to the wall by H-splines and each windowed panel is assembled at the site by securing one of said glazed windows to a mounted H-spline and installing thermally insulating sound absorbent board above and below the window.

4,503,656

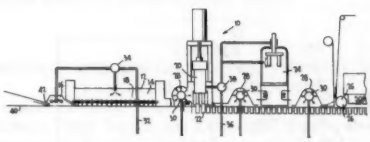
INITIAL STERILIZATION OF STERILE CHAMBER OF ASCEPTIC PACKAGING MACHINE

Jean-Claude H. Hautemont, Gif-sur-Yvette, France, assignor to Societe Anonyme dite: Etude et Realisation de Chaines Automatiques ERCA, Orsay, France

Filed Nov. 12, 1982, Ser. No. 441,304

Int. Cl.³ B65B *55/00*

U.S. Cl. 53—396 **9 Claims**

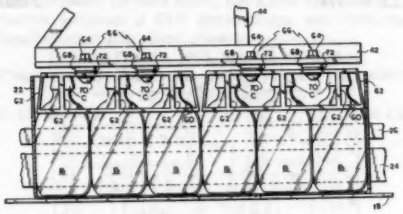


1. A sterilizing start-up setup for an asceptic forming, filling and closing apparatus of the type including an elongated internally sterile chamber initially having an open bottom with said bottom being formed during operation of said apparatus by a thermoformable base web from which containers are formed, said setup including a thermoformable base web starting end at one end of said chamber, a heat resistant web trailing end secured to said thermoformable base web starting end and extending the full length of said chamber and beyond, said heat resistant web forming a temporary base web having a peelable cover web, said cover web extending beyond said thermoformable base web and reversely out of said chamber, and means for supplying a gas at a sterilizing temperature above the softening temperature of said thermoformable base web into said chamber for heating and thus sterilizing all exposed components of said apparatus within said chamber.

4,503,657
CARRIER APPLICATOR

John F. Osteen, Lynchburg, Va., assignor to Dacam Corporation, Madison Heights, Va.

Filed Mar. 29, 1982, Ser. No. 363,267
Int. Cl.³ B65B *17/02, 21/00*
U.S. Cl. 53—48 17 Claims

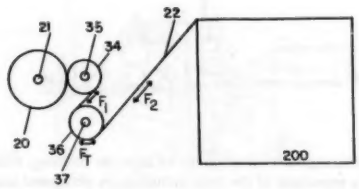


1. Apparatus for applying a carrier to a set of containers, the carrier being of the type having a surface with first and second spaced finger-grip openings therein and means for engaging the containers, said apparatus comprising a platen, means for supporting a set of containers with a carrier situated thereon and means for moving said platen towards said support means, said platen comprising means for engaging and cooperating with both of the fingergrip openings to align the carrier relative to the platen, means for exerting a force on the carrier in the direction of said supporting means to cause the containers to be received in the container engaging means, and menas for receiving the portions of the containers which extend above the container engaging means.

4,503,658
FEEDBACK CONTROLLED STRETCH WRAPPING APPARATUS AND PROCESS

Curtis A. Mouser, Louisville; Mark G. Roberts, Middletown; Daniel R. Haas, Louisville, and Patrick R. Lancaster, III, Anchorage, all of Ky., assignors to Lantech, Inc., Louisville, Ky.

Division of Ser. No. 250,926, Apr. 6, 1981,. This application Mar. 28, 1983, Ser. No. 479,360
Int. Cl.³ B65B *11/02, 57/04*
U.S. Cl. 53—399 18 Claims



1. A process of making a unitary package by wrapping a plurality of units with a stretched plastic material overwrap forming a unitary load comprising the steps of:

a. creating a relative movement between a supply of the plastic material and the load to dispense a web of stretchable plastic material from a roll across an upstream roller and a downstream roller to a rotating load;

b. applying a restriction force to the upstream roller to stretch the plastic material as it is being dispensed from the supply;

c. sensing speeds of said rollers, calculating the actual eleongation of the material between said rollers and determining and adjusting the restriction force to the upstream roller to adjust the speed of the upstream roller thereby stretching said plastic material substantially above its yield point and maintaining the elongation of said material at an infinitely variable predetermined constant elongation level E_D thereby gaining substantially in strength per cross-sectional area;

d. applying a power assistance force to the downstream roller to reduce the stretch force F_2 on the load;

e. sensing the adjusted restriction force and the applied assistance force, determining the actual force on the load, and determining and adjusting said assistance force to said downstream roller to maintain force to the load, which is equal to the difference between the adjusted restriction force and the adjusted assistance force, at a predetermined and substantially constant level and causing inelastic strain recovery before the plastic material is wrapped around the load;

f. adjusting said restriction force and said variable positive torque as said material is dispensed in order to maintain E_D and F_2 constant;

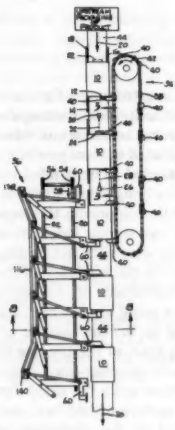
g. wrapping the load with said prestretched plastic material which has been force relieved while maintaining the majority of its elongation; and

h. severing said plastic material between said load and said supply.

4,503,659
METHOD OF GLUING END FLAPS OF A PACKAGE IN AN IN-LINE PACKAGING MACHINE

Earle C. Sherman, West Monroe, La., assignor to Manville Service Corporation, Denver, Colo.

Filed May 10, 1982, Ser. No. 376,856
Int. Cl.³ B65B *7/20*
U.S. Cl. 53—491 1 Claim



1. A method of gluing a plurality of end flaps of a package in an in-line packaging machine, the package traveling in a horizontal path from an upstream position to a downstream position in the packaging machine, the package comprising a sleeve having a top panel, a bottom panel, first and second side panels, a pair of downstream or leading end flaps hingedly attached to leading ends of the side panels and a pair of upstream or trailing end flaps hingedly attached to trailing ends of the side panels, comprising the steps of:

(a) providing an upstream stationary glue nozzle and a downstream stationary glue nozzle and at least one source of glue, the stationary glue nozzles being positioned in the line of travel of the package in the packaging machine, the downstream glue nozzle facing downwardly and up-

stream, the upstream glue nozzle facing downwardly and downstream;

(b) providing a first flap closing means adjacent to the package on one side of the packaging machine and movable along said horizontal path;

(c) moving the package downstream in the packaging machine by means of a packaging machine flight bar to the first flap closing means;

(d) folding and closing the leading and trailing end flaps which are hingedly attached to the first side panel of the package transversely across the package with the first flap closing means while continuing to move the package downstream by means of the first flap closing means;

(e) applying a predetermined quantity of adhesive to the folded and closed leading and trailing end flaps from the stationary glue nozzles and the glue source, the downstream glue nozzle applying glue from the bottom of the folded and closed leading flap to the top thereof, the upstream glue nozzle applying glue from the top of the folded and closed trailing flap to the bottom thereof, while continuing to move the package downstream in the packaging machine by means of the first flap closing means;

(f) providing a second flap closing means adjacent to the package on the other side of the packaging machine and movable along said horizontal path;

(g) folding and closing the leading and trailing end flaps which are hingedly attached to the second side panel of the package transversely across the package and across the previously folded and closed leading and trailing flaps with the second flap closing means, while continuing to move the package downstream by means of the second flap closing means;

(h) applying pressure on the pairs of previously folded leading and trailing end flaps by the second flap closing means until the glue sets, while continuing to move the package downstream in the packaging machine by means of the second flap closing means; and

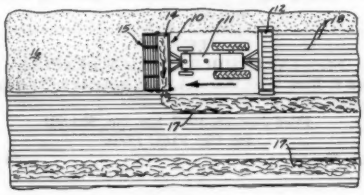
(i) releasing the pressure on the pairs of leading and trailing end flaps after the glue sets while continuing to move the package downstream in the packaging machine by means of the second flap closing means.

4,503,660

WHEAT SWATHER

Gary L. Kelderman, R.R. 1, Oskaloosa, Iowa 52577

Filed Dec. 12, 1983, Ser. No. 560,161
Int. Cl.³ A01D *43/12*
U.S. Cl. 56—11.2 **6 Claims**



1. Apparatus for permitting a longer growing season for the second crop of two crops grown in the same year on the same ground comprising:

means adapted to be operably attached to a front portion of a prime mover for cutting a first swath of crop standing in a field;

windrowing means adapted to be operably attached to said prime mover for gathering the cut crop in said swath and forming a windrow of the cut crop to one side of and outside of said first swath, said windrowing means comprising reversible means for permitting said windrow to be formed on either side of the swath being formed by said cutting means whereby the windrow can be selectively formed on soil previously having crop cut therefrom rather than on standing crops; and

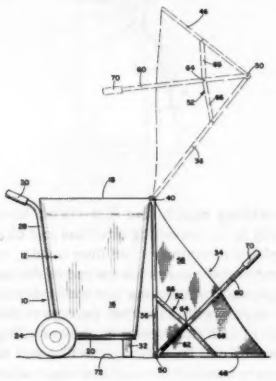
means attached to a rear portion of said prime mover for planting a second crop in the soil underlying said first swath.

4,503,661

LEAF AND LAWN DEBRIS LIFT AND BAGGER

Patrick L. Potter, 8282 S. Memorial, Ste. 118, Tulsa, Okla. 74133

Filed Aug. 22, 1983, Ser. No. 525,399
Int. Cl.³ A01D *87/00*
U.S. Cl. 56—16.6 **7 Claims**



1. A leaf and lawn debris lift and bagger apparatus comprising wheeled upstanding container means having the upper end thereof open providing access to the interior thereof, and scooper means pivotally secured to the outer periphery of the container means in the proximity of one edge of the open upper end thereof, said scooper means having a collapsed storage position and an extended scooping position and being movable to said collapsed storage position that is substantially adjacent to the outer periphery of a sidewall of the container means and movable from said collapsed position to said extended scooping position radially outward from the sidewall of the container and open to the area surrounding the container and scooper means for receiving debris therein.

4,503,662

METHOD AND APPARATUS FOR YARN PIECING IN FASCIATED YARN SPINNING

Mitsunori Horiuchi, Kariya; Yoshihisa Suzuki, Chiryu; Yoshiharu Yasui, Toyoda, and Kazuo Seiki, Kariya, all of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Aichi, Japan

Filed Sep. 21, 1982, Ser. No. 420,858
Claims priority, application Japan, Sep. 28, 1981, 56-153454; Mar. 25, 1982, 57-47737; Mar. 25, 1982, 57-47738
Int. Cl.³ D01H *15/00, 5/28*
U.S. Cl. 57—261 **9 Claims**

1. A yarn piecing apparatus for fasciated yarn spinning which comprises: means for delivering a fiber bundle from a drafting means to an air tube having a fiber passage through said air tube, said fiber passage having a fiber passage exit, said air tube having first vortex forming means for false twisting said fiber bundle, said first vortex forming means being a plurality of first jets provided on an inner circumference of said fiber passage and connected to a high-pressure air source, the plurality of first jets being arranged to provide a first vortex having a velocity vector axially in the travelling direction and circumferentially in the peripheral direction of said fiber bun-

dle, said yarn piecing apparatus comprising a suction nozzle midway of said fiber passage in said air tube and between said first jets and said fiber passage exit in the fiber bundle travelling direction, said suction nozzle being connected to a sub-atmospheric pressure air zone.

6. A yarn piecing method for joining a first end with a second end of a broken yarn in a fasciated yarn spinning process in which a fiber bundle is delivered from a drafting means and is false-twisted by a first vortex within a fiber passage within an air tube wherein the first end is the end of the bundle delivered

from said drafting means, said first vortex having a velocity vector axially in the travelling direction and circumferentially in the peripheral direction of said fiber bundle, to form a fasciated yarn and said second end is the end of the yarn leaving the fiber passage, said yarn piecing method comprising: forming a sucking air stream within the fiber passage within the air tube, downstream of said first vortex in the travelling direction of the fiber bundle; and introducing the first and second ends of the broken yarn into said sucking airstream, whereby said both ends of the broken yarn are entangled and pieced to each other.

4,503,663

OPEN-END SPINNING ROTOR

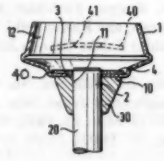
Rudolf Oexler, Ingolstadt, Fed. Rep. of Germany, assignor to Schubert & Salzer, Ingolstadt, Fed. Rep. of Germany

Filed Apr. 1, 1983, Ser. No. 481,368

Claims priority, application Fed. Rep. of Germany, Apr. 6, 1982, 3212785

Int. Cl.³ D01H *1/135, 7/882*

U.S. Cl. 57—404 **6 Claims**



1. An open-end spinning rotor assembly comprising:

a rotor shaft having a smooth surface,

a collar carried on said rotor shaft,

a spinning rotor having an open interior carried on said rotor shaft with said smooth surface upper portion of said rotor shaft extending into said interior of said rotor, and a clamping disk carried on said smooth surface upper portion of said shaft pressing and spinning rotor against said collar securing said rotor on said shaft.

4,503,664

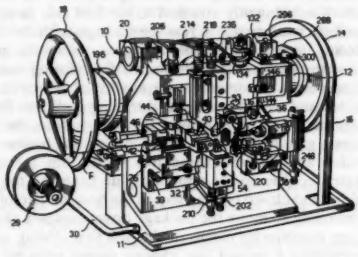
ROPE CHAIN MACHINE

Felice Allazzetta, Albiano, and Luigi Prola, Borgofranco d'Ivrea, both of Italy, assignors to Morris Jaeger, Brooklyn, N.Y.

Filed Jan. 18, 1983, Ser. No. 458,970

Int. Cl.³ B21L *11/00*

U.S. Cl. 59—16 **16 Claims**



7. A machine for making a chain in the form of a rope constituted by a helical series of open rings each of which is interlinked with adjacent rings so as to define a configuration similar to a continuous double-stranded rope, comprising:

a frame which carries a device for feeding a wire along a feed path;

a forming unit fed intermittently by the feed device and arranged to cut successive pieces of wire and form each of these pieces into a substantially circular open ring;

a conveyor member for the rings, which is associated with the forming unit and is movable reciprocatingly along a conveying path;

a linking unit spaced from the forming unit along the conveying path and arranged to receive from the conveyor member the open rings formed by the forming unit, the linking unit including a final receiving and holding member and gripper means for taking the rings from the conveyor member and introducing and positioning the rings in the receiving and holding member in alternately overturned positions so that each of the rings embraces a plurality of preceding rings;

means for feeding a reinforcement of wires to the receiving and holding member; and

actuator means for operating the feed device, the forming unit with the conveyor member, and the gripper means of the linking unit in a predetermined operating sequence.

4,503,665

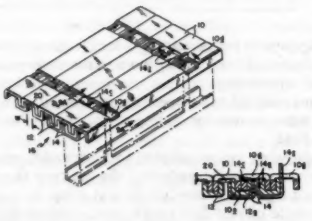
NON-EXPANSIBLE LINKAGE BRACELET

Stephen F. Bert, West Warwick, R.I., assignor to Textron, Inc., Providence, R.I.

Filed Jun. 13, 1983, Ser. No. 503,801

Int. Cl.³ F16G *13/00*

U.S. Cl. 59—82 **14 Claims**



1. A non-expansible linkage bracelet comprising:

a set of first links having channel-shaped cross sections with first side members joined by first intermediate members, said first side members each having at least one first locking lug protruding therefrom and said intermediate members having first openings therein;

a set of second links having channel-shaped cross sections with second side members joined by second intermediate members having second openings therein, the channel-shaped cross sections of said second links being inverted relative to the channel-shaped cross sections of said first links and being positioned such that successive first links having confronting first side members located adjacent to and confined between second side members of individual second links, with said first locking lugs protruding through said second openings and being bendably deformed to overlap adjacent first and second side members in a manner which interlocks said first and second links into a skeleton structure having successive first links laterally adjacent to each other and successive second links laterally spaced from each other; and

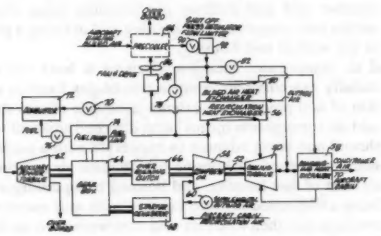
a set of shells having channel-shaped cross sections with third side members joined by third intermediate members, at least one of said third side members on each of said shells having at least one second locking lug protruding therefrom, the channel-shaped sections of said shells being arranged to overlie said second links, with said third side members being located in the spaces between said second links, and with said second locking lugs protruding through said first openings and being bendably deformed to overlap adjacent first and second side members in a manner which interlocks said shells to said skeleton structure.

4,503,666

AIRCRAFT ENVIRONMENTAL CONTROL SYSTEM WITH AUXILIARY POWER OUTPUT

William J. Christoff, Thousand Oaks, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed May 16, 1983, Ser. No. 494,824
Int. Cl.³ F02C *6/08*
U.S. Cl. 60—39.07 **8 Claims**



1. An environmental control system for a jet engine propelled aircraft, comprising:

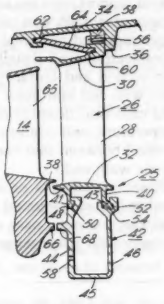
an air compressor, a cooling turbine, an overrunning clutch, and a power turbine rotatively coupled to the compressor and the cooling turbine, the clutch being located between the power turbine and said other components, means directing compressed air from the compressor to the power turbine, means for mixing fuel with said compressed air and burning said mixture to fuel the power turbine and drive the compressor, means for directing compressed air from the compressor to the cooling turbine, the cooling turbine expanding and cooling the compressed air, and means using the cooled output air of the cooling turbine to air-condition the aircraft.

4,503,667

TURBINE OVERSPEED LIMITER FOR TURBOMACHINES

Derek A. Roberts, Bristol, England, assignor to Rolls-Royce Limited, London, England

Filed Oct. 6, 1983, Ser. No. 539,379
Claims priority, application United Kingdom, Oct. 6, 1982, 8228581
Int. Cl.³ F02G *3/00;* **F01B** *25/16;* **F01D** *21/00*
U.S. Cl. 60—39.091 **7 Claims**



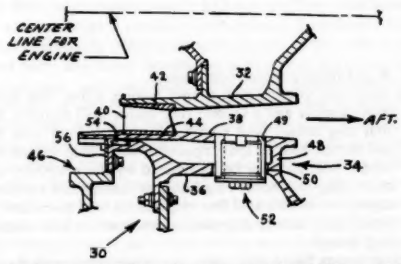
1. A mechanism for preventing a turbine rotor of a gas turbine engine exceeding a predetermined speed if a shaft, connecting the turbine rotor to a compressor rotor, breaks and releases its torsional and axial constraint on the turbine rotor, the mechanism comprising a segmented stator vane assembly downstream of a stage of the turbine rotor, a constraining means operable to constrain the radially outer ends of the segments of the assembly against displacement bodily in a downstream direction, and static structure of the engine on which the radially inner ends of the segments are mounted, the structure including a releasable means which is operable, when struck in an axial direction by the rotor as a result of the shaft breaking, to release the inner ends of the segments and allow the segments to tilt into the path of the turbine rotor blades and thereby destroy the blades and decelerate the turbine rotor.

4,503,668

STRUTLESS DIFFUSER FOR GAS TURBINE ENGINE

Garland H. Duncan, III, Tequesta, and David L. Cooper, North Palm Beach, both of Fla., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 12, 1983, Ser. No. 484,390
Int. Cl.³ F02C *7/20*
U.S. Cl. 60—39.32 **3 Claims**



1. An improved diffuser for a gas turbine engine, said improved diffuser mounted between a compressor section and a burner section of said gas turbine engine, said improved diffuser comprising:

an inner case wall, said inner case wall being annular shaped

and centered about an engine centerline of said gas turbine engine;

a double outer wall, said double outer wall having a cantilevered case wall and an outer case wall, said cantilevered case wall connected at one end by a connecting wall to said outer case wall, said cantilevered case wall forming an annular flowpath with said inner case wall, said flow path allowing compressed air to flow therethrough from said compressor section to said burner section;

a plurality of exit guide vanes fixedly attached to said inner case wall and to said cantilevered case wall, said vanes acting as structural support between said cantilevered case wall and said inner case wall, said cantilevered case wall having said vanes mounted proximal to said compressor section and a connecting wall distally located from the said compressor section and unitarily connected to said cantilevered case wall and said outer case wall such that said cantilevered case wall flexes in response to gas pressure and gas temperature, said double outer wall having an annular void formed between said cantilevered case wall and said outer case wall; and

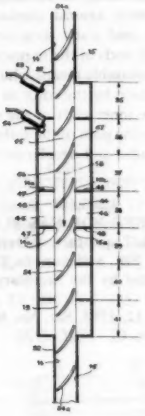
said improved diffuser including a probe mounted in said double outer wall and a seal mounted between said cantilevered case wall and said outer case wall near said vanes for preventing compressor gas leakage from entering said annular void.

4,503,669

GAS TURBINE THRUST SYSTEM

Henri Geoffroy, 5235, rue des Arbres, Pierrefonds, Quebec, Canada H8Z 2M1

Filed Feb. 25, 1983, Ser. No. 469,999
Int. Cl.[3] F02C *3/00*
U.S. Cl. 60—39.75 **30 Claims**



1. A gas turbine motor comprising:

at least one reaction ring tunnel having a first ring tunnel wall member and a second ring tunnel wall member, said first ring tunnel wall member being provided with first and second spaced apart opposing walls, said second ring tunnel wall member being defined by the periphery of a rotor ring; said rotor ring being in sealing and rotational engagement with said first ring tunnel wall member,

a power shaft axially disposed with respect to said reaction ring tunnel,

fixing means fixing said rotor ring to said power shaft,

two spaced apart cover plates sealingly fixed to said first ring tunnel wall member, the fixing means fixing said rotor ring to said power shaft being disposed between said cover plates, said power shaft being in sealing and rotational engagement with said cover plates, said cover plates and said first ring tunnel wall member defining a shroud for said rotor ring and the means fixing said rotor ring to said power shaft,

radial reaction blades fixed to said rotor ring and disposed in said reaction ring tunnel between said first and second opposing walls, said reaction blades being spaced apart from each other by a gap and being distributed around the periphery of said rotor ring, each of said reaction blades being spaced apart from said first ring tunnel wall member to provide a small clearance therebetween, each of said reaction blades having a leading edge and a following edge, said leading edge being adjacent to said first opposing wall, said following edge being adjacent to said second opposing wall,

at least one reaction chamber comprising two end tunnel segments spaced apart by a plurality of abutting zones, each end tunnel segment comprising respective length portions of said first and second ring tunnel wall members and having a length whereby at least one reaction blade is always completely disposed therein, each zone comprising respective length portions of said first and second ring tunnel wall members, the portion of the first opposing wall of each zone being provided with a first gas aperture, the portion of the second opposing wall of each zone being provided with a second gas aperture, said zones commencing with a first zone and terminating with an exhaust zone, the second gas aperture of said exhaust zone being in gas communication with an exhaust conduit, the second gas aperture of each of the other zones being in gas communication with the first gas aperture of the following abutting zone by means of a respective exterior gas heat exchange conduit,

combustion means, in which fuel can be combusted, having a fuel inlet, a compressed air inlet and igniter means, the first gas aperture of the first zone of said reaction chamber being in gas communication with said combustion means,

said combustion means, said reaction chamber and said reaction blades being adapted to cooperate so that combustion gas is supplied to said reaction chamber and reacts upon the reaction blades to impart thrust to said rotor ring,

a compressed air housing fixed to said first ring tunnel wall member and having an air inlet, said first ring tunnel wall member and said exterior gas conduits being disposed within said compressed air housing and defining a portion of the wall of said housing,

and air compression means comprising at least one set of radially extending air compression blades fixed to a portion of said power shaft extending outside of said shroud, said air compression means being disposed adjacent to said shroud and being adapted to cooperate with a portion of said compressed air housing to compress air entering the air inlet of said housing, said housing being configured to bring compressed air into contact with said exterior gas conduits and then to direct said compressed air to the air inlet of said combustion means, said exterior gas conduits being adapted to allow indirect heat exchange between combustion gas and compressed air.

4,503,670

DECELERATION LIMITER, PARTICULARLY FOR A TURBINE ENGINE

Yves-Marie M. R. Francois, Dammarie les Lys, and Jean-Claude Vergnes, Le Mee sur Seine, both of France, assignors to S.N.E.C.M.A., Paris, France

Filed Jul. 8, 1982, Ser. No. 396,284
Claims priority, application France, Jul. 8, 1981, 81 13383
Int. Cl.[3] F02C *9/00*
U.S. Cl. 60—39.281 **5 Claims**

1. In a turbine engine having a throttle lever, a fuel metering valve and a fuel controller element connected between said

throttle lever and said fuel metering valve, a deceleration limiter comprising:

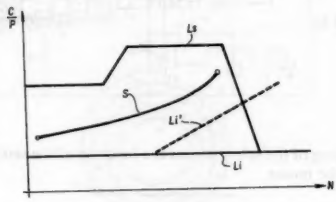
a cam movable with said throttle lever;

a hydraulic damper;

a free piston forming a first piston in said damper;

a spring having one end contacting said fuel controller element and a second end contacting one side of said first piston;

a movable push rod extending into said damper and forming a second piston of a smaller diameter than said first piston,



one end of said push rod being positioned to contact a second side of said first piston and a second end of said push rod being positioned to contact said cam;

hydraulic fluid in said damper;

a fluid inlet including one way valve means connected to said damper on a first portion corresponding to said second side of said first piston for permitting hydraulic fluid to enter said damper; and

a fluid outlet including flow restriction means connected to said first portion of said damper.

4,503,671

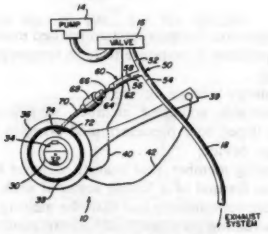
APPARATUS AND METHOD FOR FORCE FEEDING AIR TO A CARBURETOR USED WITH AN INTERNAL COMBUSTION ENGINE

Raymond C. Smith, 508 Hugh St., Parkersburg, W. Va. 26101

Filed Jun. 23, 1983, Ser. No. 507,030

Int. Cl.³ F01N 3/32

U.S. Cl. 60—274 **6 Claims**



1. In an internal combustion engine having a carburetor for controlling the supply of air and fuel to the engine, an air filter housing connected to the carburetor, an exhaust system for conveying combustion products from the engine, an air pump for supplying pressurized air to the exhaust system to control gas emissions, and exhaust tubing interconnecting the air pump with the exhaust system and including an air diverter valve for controlling the volume of air flow from the air pump, the improvement comprising:

connecting means having an inlet end and an outlet end, said inlet end being connected to the exhaust tubing extending between the air diverter valve and the exhaust system, said outlet end being connected to said carburetor air filter housing at a point between an air filter in said housing and the air inlet to the carburetor to bypass the air filter element in the air filter housing so that pressurized air is supplied to the interior of the carburetor from the air pump to enhance uniform distribution of the fuel air mixture and increase fuel economy and engine power output.

6. A method of improving the operation of an internal combustion engine equipped with an air pump for supplying pressurized air to the exhaust system of the engine, said method comprising:

diverting a portion of the pressurized air flowing from the air pump to the exhaust system;

filtering the diverted portion of the pressurized air; and

directing the filtered, diverted air into an air cleaner housing communicating with the air intake of a carburetor and at a point between an air filter in the air cleaner housing and the air inlet to the carburetor to thereby enhance air flow through the carburetor and increase uniform distribution of an air-fuel mixture to the cylinders of the engine to increase fuel economy and engine power output.

4,503,672

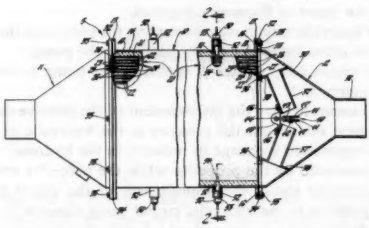
DIESEL EXHAUST CLEANER WITH GLOW PLUG IGNITERS AND FLOW LIMITING VALVE

Terrence L. Stark, Washington, and Otto A. Ludecke, Rochester, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Nov. 25, 1983, Ser. No. 555,055

Int. Cl.³ F01N 3/02

U.S. Cl. 60—286 **3 Claims**



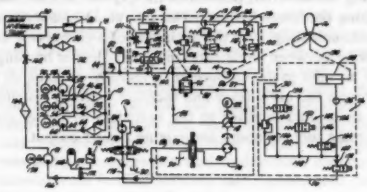
1. An exhaust cleaner and particulate igniter system for use with a diesel engine, said system including a housing having an inlet at one end for receiving exhaust flow from an engine and an exhaust outlet at its opposite end; a particulate filter means operatively positioned in said housing intermediate said inlet and said exhaust outlet and having an inlet face adjacent to said inlet and an outlet face next adjacent to said exhaust outlet; first and second secondary exhaust outlet ducts operatively positioned in said exhaust outlet with their inlet ends positioned next adjacent to opposite outboard zones of said outlet face and with their outlet ends located in the exhaust flow path through said exhaust outlet; a normally open, exhaust flow limiter valve means operatively positioned between said outlet ends of said outlet ducts and being movable so as to selectively block flow through said outlet ends; electrical igniter means operatively supported by said housing on opposite outboard sides thereof intermediate said inlet face and said outlet face of said filter means, said electrical igniter means extending into said opposite outboard zones of said particulate filter means as defined by said outlet ducts; and, control means operatively connected to said valve means and to said electrical igniter means whereby said valve means can be moved to sequentially block flow through one of said outlet ends so as to substantially block exhaust flow through the associate one of said outboard zones and, at the same time to energize said igniter means associated with the associate said outboard zone whereby to ignite particulates trapped in the associate said outboard zone of said particulate filter.

4,503,673

WIND POWER GENERATING SYSTEM

Charles Schachle, 1032 Grant St., Moses Lake, Wash. 98837; Patrick J. Schachle; Edward C. Schachle, both of 18427 Military Rd. S., Seattle, Wash. 98188, and John R. Schachle, 625 Wellington, #A-12, Walla Walla, Wash. 99362

Filed May 25, 1979, Ser. No. 42,496
Int. Cl.[3] F03D *7/04, 9/00, 11/02;* F04B *17/02*
U.S. Cl. 60—398 58 Claims



1. A wind power generator of the type that varies propeller speed with wind speed comprising:

(a) a tower having a base and a propeller mount above the base;

(b) a propeller mounted on the propeller mount of the tower for being driven in rotation by the wind;

(c) a positive displacement hydraulic pump;

(d) a positive displacement hydraulic motor;

(e) load means driven by the motor and operable to maintain the speed of the motor constant;

(f) hydraulic circuit means coupling the pump and the motor to drive the motor by the output of the pump;

(g) means coupling the propeller to the pump to drive the pump; and

(h) means to vary the displacement of the positive displacement motor and the pressure in the hydraulic circuit in response to a change in pressure in the hydraulic circuit produced by the propeller while the propeller rotates at constant speed, the displacement of the motor and the pressure in the hydraulic circuit being changed in accordance with a predetermined schedule that corresponds the pressure in the hydraulic circuit with wind speed so that the displacement of the motor, the pressure in the hydraulic circuit, and propeller speed increase with increasing wind speed and decrease with decreasing wind speed and the power produced by the wind power generator varies accordingly, the hydraulic circuit and the constant speed of the motor preventing a change in propeller speed until the displacement of the motor changes.

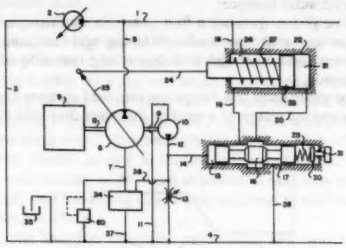
4,503,674

HYDROSTATIC DRIVE SYSTEMS

Wolfgang Backe, Aachen; Franz Weingarten, Frechen, and Hubertus Murrenhoff, Aachen, all of Fed. Rep. of Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany

Filed Aug. 2, 1982, Ser. No. 404,509
Claims priority, application Fed. Rep. of Germany, Aug. 3, 1981, 3130658
Int. Cl.[3] F16D *33/02*
U.S. Cl. 60—448 6 Claims

1. In a hydrostatic drive system with an adjustable hydraulic motor operatively connected between a high pressure main line and a low pressure line and equipped with a control arrangement that influences the setting in a r.p.m.-dependent manner, the improvement comprising a safety means in series between the motor and one of the high pressure line and the low pressure line that limits the stream flowing through the hydraulic motor, said safety means being adjustable and fluid pressure means acting on the safety means and motor whereby



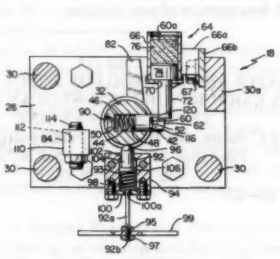
the setting of the safety means is a function of the setting of the hydraulic motor.

4,503,675

FAIL-SAFE ACTUATOR WITH FUSIBLE LINK

John F. Gardner, Loveland, and Thomas W. Showalter, Milford, both of Ohio, assignors to Xomox Corporation, Cincinnati, Ohio

Filed Feb. 26, 1982, Ser. No. 352,542
Int. Cl.[3] F16K *17/40*
U.S. Cl. 60—527 25 Claims



1. An apparatus for moving a controlled member to a predetermined position in response to high temperature conditions, comprising:

(a) an energy storage device;

(b) a movable actuating member, said actuating member being urged to a predetermined position by said energy storage device;

(c) a bearing member, said bearing member having at least a portion formed of a fusible material with a melting temperature substantially less than the melting temperature of said actuating member, said bearing member being selectively engageable with said actuating member and operative to prevent movement of said actuating member under the urging of said energy storage device only when said fusible material is in an unmelted condition;

(d) a stop member for limiting movement of said actuating member after movement from said bearing member after said fusible material is in a meltable condition; and

(e) a controlled member connected to said actuating member and movable therewith, said controlled member being moved from a first position corresponding to said actuating member's engagement with said bearing member to a second position corresponding to said actuating member's engagement with said stop member;

said actuating member being selectively movable from said second position to said first position and having means that latches with said bearing member when said fusible material is in said unmelted condition and said bearing member is in its

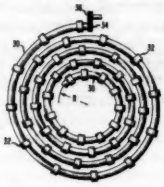
assembled condition in said apparatus and said actuating member is moved to said first position whereby said means that latches comprises latching means.

4,503,676

APPARATUS FOR DIRECTLY CONVERTING THERMAL TO ROTATIONAL ENERGY

Donald R. Rutledge, Budd Lake, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 30, 1983, Ser. No. 567,051
Int. Cl.³ F03G 7/00
U.S. Cl. 60—527 15 Claims



1. Apparatus for converting solar energy into rotational energy, comprising

a shaft of elastic material having a relatively high thermal coefficient of expansion and an axial length much greater than its cross-sectional dimension,

a plurality of journals located at prescribed points along the shaft, and

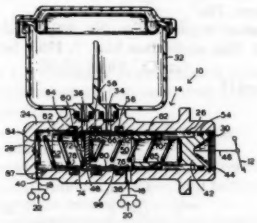
a plurality of circular bearings for receiving the journals, each bearing fixedly mounted to a base and positioned for supporting and constraining the shaft into a spiral oriented so that the inside concave surface is heated by the solar energy and in which the shaft material and the radius of curvature is selected such that the elastic limit of the shaft is not exceeded.

4,503,677

MASTER CYLINDER

Donald A. Crumb, Mishawaka, and Richard A. Zander, South Bend, both of Ind., assignors to Allied Corporation, Morristown, N.J.

Filed May 20, 1982, Ser. No. 380,203
Int. Cl.³ B60T 11/20
U.S. Cl. 60—562 3 Claims



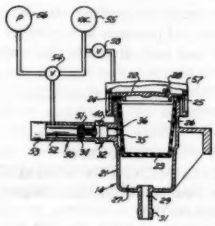
1. A master cylinder for communicating fluid pressure to a pair of brake circuits, the master cylinder comprising a housing having a bore therein receiving a pair of pistons, one of the pistons at an open end of the bore cooperating with the other piston to substantially define a primary pressure chamber therebetween, the other piston cooperating with the housing to substantially define a secondary pressure chamber adjacent a bottom wall of the bore, the pair of pressure chambers fluidly communicating with a reservoir via a pair of ports in the housing in a rest position, the pair of pistons being movable during braking to generate fluid pressure within the pair of pressure chambers, and sealing means between the housing and the other piston to fluidly isolate the pressure chambers, characterized in that said sealing means comprises at least three sealing members engageable with said other piston, two of said sealing members cooperating with said other piston to define passages permitting communication between said ports and said pressure chambers, respectively, said third sealing member sealingly engaging said housing and said other piston between said ports to fluidly isolate said passages, and said ports are disposed within said housing between said two sealing members and separated by said third sealing member to provide for a short housing length.

4,503,678

RESERVOIRS FOR LIQUID PRESSURE CONTROL SYSTEMS AND A METHOD OF FILLING THE SAME

Maurice J. Wimbush, Leamington Spa, England, assignor to Automotive Products, plc, Leamington Spa, England

Continuation of Ser. No. 400,276, Jul. 21, 1982, abandoned, which is a continuation-in-part of Ser. No. 338,165, Jan. 8, 1982, abandoned. This application Apr. 11, 1984, Ser. No. 599,249
Claims priority, application United Kingdom, Jan. 21, 1981, 8101849
Int. Cl.³ B60T 11/26
U.S. Cl. 60—584 5 Claims

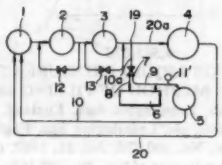


3. A method of initially charging a hydraulic fluid control system with hydraulic fluid, said hydraulic fluid control system comprising a hydraulic master cylinder, a remote hydraulic slave cylinder connected to the master cylinder via a conduit, and a reservoir of hydraulic fluid feeding the master cylinder, said reservoir comprising a reservoir body having a mouth, a detachable cap mounted on the mouth of the body and removable for replenishing the reservoir with hydraulic fluid, a diaphragm secured in position by said cap and removable for replenishing the reservoir with hydraulic fluid, said diaphragm dividing the reservoir body into two chambers, one of said chambers being an air chamber vented to atmosphere through an aperture in the cap and the other of said chambers being a hydraulic fluid chamber containing hydraulic fluid and connectable to the master cylinder, an inlet port defined in a wall of the reservoir body for the initial charging of hydraulic fluid into the hydraulic fluid chamber without necessitating the removal of the cap and diaphragm, and a closure plug located in the inlet port for subsequent sealing thereof after the initial charging, wherein the inlet port and the closure plug are so constructed and arranged as to allow excess hydraulic fluid in the hydraulic fluid chamber to exit the reservoir past the closure plug when a predetermined pressure differential exists across the closure plug, said method comprising applying vacuum to the system via the inlet port, introducing hydraulic fluid into the system via the inlet port, and subsequently sealing the system by installing the plug in the inlet port, said inlet port and said plug being arranged in assembly to allow the hydraulic fluid to flow through the assembly from the hydraulic fluid chamber to ambient upon excessive hydraulic fluid pressure in the hydraulic fluid chamber.

4,503,679
OIL COOLER SYSTEM FOR MOTOR VEHICLES WITH TURBO CHARGERS

Taiji Saito, Okazaki; Mitsuhisa Kato, and Kimioki Yasunaga, both of Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Aug. 18, 1982, Ser. No. 409,178
Claims priority, application Japan, Jan. 29, 1982, 57-12957
Int. Cl.³ F02B 33/40
U.S. Cl. 60—605 9 Claims



1. An oil cooler system for a motor with a turbo charger, comprising:

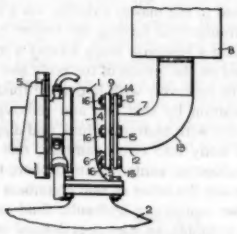
a first oil circuit connecting an oil pan, an oil pump, an oil filter, an oil cooler, a turbo charger and said oil pan in that order; and

a second oil circuit connecting said oil pan, said oil pump, said oil filter, oil passages in a cylinder head and block of said motor and said oil pan in that order.

4,503,680
ATTACHMENT FOR EXHAUST PIPE

Terry G. Wood, Fountain City, Ind., assignor to Allis-Chalmers Corp., Milwaukee, Wis.

Continuation-in-part of Ser. No. 318,477, Nov. 5, 1981, abandoned. This application Mar. 20, 1984, Ser. No. 591,241
Int. Cl.³ F02B 37/00; F16L 25/00
U.S. Cl. 60—605 9 Claims

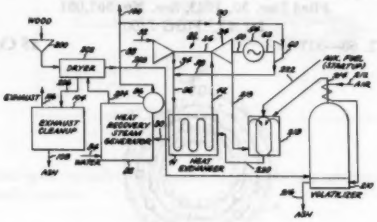


1. An exhaust system for an internal combustion engine comprising, a supporting conduit member including a peripheral flange defining an edge having essentially a cross-sectional configuration of 90°, an exhaust pipe received in said conduit member and including a deformable peripheral bead, an adjoining portion of said exhaust pipe joining said bead to the cylindrical portion of said exhaust pipe defining a curvature forming a radius, an aligning external peripheral surface on said exhaust pipe bearing against the inner peripheral surface of said conduit member, a clamping ring embracing said exhaust pipe engaging said peripheral bead, fastening means clamping said peripheral flange and said clamping ring against opposing sides of said peripheral bead and pressing said edge of said flange firmly against said adjoining portion to form a sealed coupling between said support member and said exhaust pipe.

4,503,681
STATE-OF-THE-ART GAS TURBINE AND STEAM TURBINE POWER PLANT

David M. Willyoung, Scotia, and Ashok K. Anand, Clifton Park, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jul. 14, 1983, Ser. No. 513,934
Int. Cl.³ F01K 23/04
U.S. Cl. 60—655 13 Claims



1. An improved power plant comprising:

(a) state-of-the-art turbine apparatus having a turbine section, and a compressor section driven in part by the turbine section for supplying pressurized air;

(b) a combustor for burning a solid or low quality liquid fuel to form combustion gases;

(c) a heat recovery steam generator receiving water and said combustion gases for converting said water to steam;

(d) a steam turbine driven by said steam for assisting said gas turbine section to drive said compressor section;

(e) means for combining steam discharged from said steam turbine with the pressurized air to create a motive stream;

(f) a heat exchanger receiving in heat exchange relationship said combustion gases and said motive gas stream for transferring heat from said combustion gases to said motive gas stream;

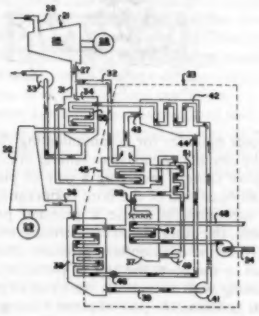
(g) means for routing the heated motive gas stream from said heat exchanger to said gas turbine apparatus to drive said turbine section; and

(h) means for routing the motive gas stream from said turbine section into said combustor.

4,503,682
LOW TEMPERATURE ENGINE SYSTEM

Joel H. Rosenblatt, Big Pine Key, Fla., assignor to Synthetic Sink, Miami, Fla.

Continuation-in-part of Ser. No. 400,464, Jul. 21, 1982, abandoned. This application Mar. 7, 1983, Ser. No. 473,123
Int. Cl.³ F01K 25/00
U.S. Cl. 60—671 18 Claims



1. An improved low temperature engine system, comprising:

means for supplying a flow of heat energy input to the low temperature engine system;

an absorbtion-refrigeration subsystem having a circulating absorbent-refrigerant liquor for receiving and for synthesizing and imparting to a condenser a continuous-flow low temperature heat sink at a selected temperature;

a low temperature heat engine having a power turbine and a circulating thermodynamic medium in heat exchange communication with said heat energy input means and in heat exchange communication at said condenser with said absorbtion-refrigeration subsystem, said low temperature heat engine operating across a thermal gradient having a high temperature end of flowing thermodynamic medium that is in heat exchange communication with said heat energy input means, said low temperature heat engine has a low temperature end through which the thermodynamic medium flows before heat exchange communication thereof with said synthesized continuous-flow low temperature heat sink of the absorbtion-refrigeration subsystem, and said thermodynamic medium has a vaporization temperature lower than that of steam at the same pressure and a melting point temperature lower than that of water;

an external cooling source for providing a cooling fluid in heat exchange communication with said absorbent-refrigerant liquor; and

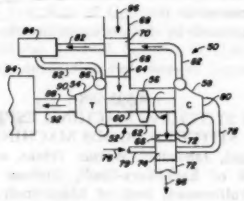
said heat exchange communication at said condenser between the circulating thermodynamic medium and the absorbtion-refrigeration subsystem is carried out without the need for providing said cooling fluid to said condenser.

4,503,683

COMPACT COOLING TURBINE-HEAT EXCHANGER ASSEMBLY

Kurt H. Wieland, Rolling Hills Estates; Donald M. Spencer, Van Nuys, and Robert C. Kinsell, Los Angeles, all of Calif., assignors to The Garrett Corporation, Los Angeles, Calif.

Filed Dec. 16, 1983, Ser. No. 562,490
Int. Cl.³ F25B *9/00*
U.S. Cl. 62—86 **10 Claims**



1. Apparatus for providing environmental control cooling air to a conditioned space such as an aircraft cabin or the like, said apparatus comprising:

(a) an air cycle cooling machine comprising:

(1) turbine means,

(2) compressor means spaced from said turbine means,

(3) fan means positioned between said turbine means and said compressor means, and

(4) shaft means drivingly interconnecting said turbine means, said compressor means and said fan means;

(b) a first heat exchanger having first and second thermally communicating flow paths extending therethrough;

(c) a second heat exchanger having first and second thermally communicating flow paths extending therethrough;

(d) duct means for flowing ambient air sequentially through said first flow path of said first heat exchanger, said fan means, and said first flow path of said second heat exchanger in response to operation of said fan means;

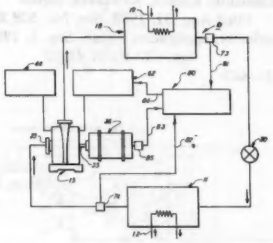
(e) duct means for flowing pressurized air from a source thereof sequentially through said second flow path of said second heat exchanger, said compressor means, said second flow path of said first heat exchanger, and said turbine means to thereby simultaneously operate said turbine means, said fan means and said compressor means, the pressurized air exiting said turbine means being suitable for use as environmental control cooling air.

4,503,684

CONTROL APPARATUS FOR CENTRIFUGAL COMPRESSOR

Gordon L. Mount, West Monroe; Phiroze Bandukwalla, North Syracuse, and Jarso Mulugeta, Dewitt, all of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Dec. 19, 1983, Ser. No. 562,763
Int. Cl.³ F25B *1/00*
U.S. Cl. 62—115 **13 Claims**



1. A method of controlling a motor driven centrifugal compressor used in a refrigeration system that includes the steps of

providing a diffuser section in the compressor having a movable wall for varying the width of the diffuser and thereby change the compressors surge point within a predetermined operating range,

measuring both the lift and the flow of the compressor,

defining the optimum position of the movable diffuser wall at the measured lift and flow for providing maximum operating efficiency without the compressor surging, and

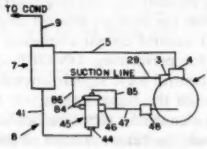
moving the diffuser wall to the optimum position.

4,503,685

OIL CONTROL VALVE FOR REFRIGERATION SYSTEM

Leonard J. DiCarlo, Maryland Heights; Roland A. Ares, St. Charles, and Robert O. Norton, Chesterfield, all of Mo., assignors to Hussmann Corporation, Bridgeton, Mo.

Division of Ser. No. 442,967, Nov. 19, 1982, Pat. No. 4,478,050.
This application Apr. 12, 1984, Ser. No. 599,347
Int. Cl.³ F25B *31/00*
U.S. Cl. 62—193 **15 Claims**



1. In an oil separation system for a refrigeration system having compressor means with a high pressure discharge side and a low pressure suction side, and which system includes oil reservoir means forming a high pressure source of liquid oil, and oil delivery means having oil level control means comprising an oil float valve sensing the oil level in said compressor means and adapted to feed oil upon demand to maintain a predetermined oil level for said compressor means; the improvement comprising pressure differential valve means

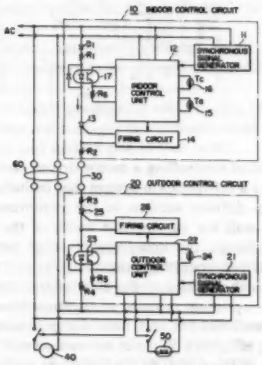
adapted to be disposed in an oil return line between said oil reservoir means and said oil float valve, said pressure differential valve including pressure regulating means constructed and arranged to produce a substantial drop in oil pressure thereacross from the high side oil pressures prevailing in said reservoir means to a preselected low side pressure differential relative to the suction pressure of said compressor means.

4,503,686

CONTROL SYSTEM FOR A SPLIT TYPE AIR-CONDITIONER

Ken'ichi Moizumi, Fuji, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Aug. 31, 1983, Ser. No. 528,246
Claims priority, application Japan, Sep. 8, 1982, 57-156444
Int. Cl.³ F25B *43/02*
U.S. Cl. 62—467 **12 Claims**



1. A control system for a split type air-conditioner comprising an indoor control circuit for controlling an indoor unit, and an outdoor control circuit for controlling an outdoor unit wherein control signals are exchanged between the indoor and outdoor control units via a signal conductor, wherein

the indoor and outdoor control circuits are connected to a common AC power supply,

the indoor control circuit comprises a first switching element for performing ON-OFF operation to serially transmit control logic signals towards the outdoor control circuit through the signal conductor, and a first signal receiving element for receiving control logic signals transmitted from the outdoor control circuit,

the outdoor control circuit comprises a second switching element for performing ON-OFF operation to serially transmit control logic signals towards the indoor control unit through the signal conductor, and a second signal receiving element for receiving control logic signals transmitted from the indoor control circuit,

said first and second switching elements and said signal receiving elements are connected in series with each other by the signal conductor,

one end of said signal conductor is connected to a first point in said indoor unit having a first AC potential, while the other end of said signal conductor is connected to a second point in said outdoor unit having a second AC potential different from said first AC potential, and

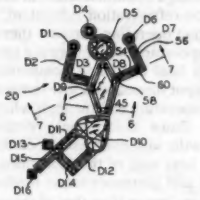
the switching element provided in said other control circuit is kept closed when control logic signals are transmitted from one of the indoor and outdoor control circuits to the other control circuit.

4,503,687

MEANS FOR AND PROCESSES OF MOUNTING GEM STONE CLUSTERS

Moshe Tessler, 626 Wythe Pl., Apt. 5E; Chaim Silberman, 571 Wythe Pl., both of Brooklyn, N.Y. 11211, and Richard Zollman, 158 Belgielei, 2000 Antwerpen, Belgium

Filed Mar. 10, 1982, Ser. No. 354,776
Int. Cl.³ A44C *17/02*; B22C *7/02*
U.S. Cl. 63—28 **4 Claims**



1. A process of making jewelry comprising the steps of:

(a) selecting a group of gem stones according to size, shape, and color;

(b) arranging said selected group of gem stones in a desired geometrical pattern or cluster arrangement and laying out the arrangement of gem stones on a transparent surface;

(c) inverting the gem stone arrangement and transparent surface, and forming a pattern by tracing the inverted gem stone arrangement through said transparent surface thereby forming a pattern from the cluster arrangement;

(d) custom forming an individual setting for each gem stone in said group;

(e) welding together said individual settings in the desirable geometrical pattern or arrangement; and

(f) setting said gem stones into substantially all settings, each stone being set in its own individual setting; whereby the impact of the resulting jewelry is one of a cluster of gem stones and is not one of a piece of gold or other metal with gem stones set on it.

4. A product made by the process of any one of the claims 1, 2, or 3.

4,503,688

CHAIN STITCHING MACHINE, ESPECIALLY STITCHED GOODS MACHINE

Wolfgang Vogel, Jahnsdorf; Werner Trinks, and Horst Heilmann, both of Karl-Marx-Stadt, Dietmar Grenzendorfer; Dietmar Wolfermann, both of Marx-Stadt all of German Democratic Rep., assignors to VEB Kombinat Textima, Karl-Marx-Stadt, German Democratic Rep.

Filed May 26, 1982, Ser. No. 382,314
Claims priority, application German Democratic Rep., Sep. 7, 1981, 233086
Int. Cl.³ D04B *23/06*
U.S. Cl. 66—85 A **10 Claims**

1. A warp-knitting machine, comprising:

(A) at least one sliding needle having a hook, which can be moved back and forth for penetrating a base material to be sewn,

(B) at least one element for closing the hook on said sliding needle,

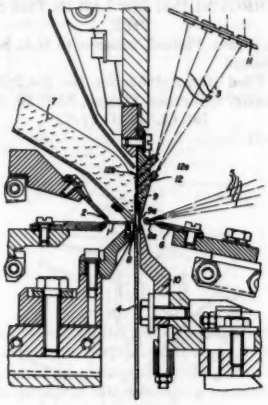
(C) a knock-off comb positioned substantially perpendicular to said sliding needle,

(D) bracing means including an upper part with at least one bracing pin, and a lower part, both parts being mounted parallel to the knock-off comb, said bracing means having a first side for contacting and thereby bracing the base material and a second side more remote from the base material,

(E) at least one guiding means for a warp element to be sewn onto the base material above the stitch formation zone,

which is located on the upper part of the bracing means, and

(F) at least one guide needle, which leads a thread for linking the warp element with the base material, and which is positioned on a bar;



said guiding means being configured with at least one entrance opening for the warp element, which is positioned on said second side of the bracing means and which furthermore has at least one exit opening for the warp element which is positioned on said first side of the bracing means.

4,503,689

FABRIC TAKE-DOWN MECHANISM FOR FLAT KNITTING MACHINES

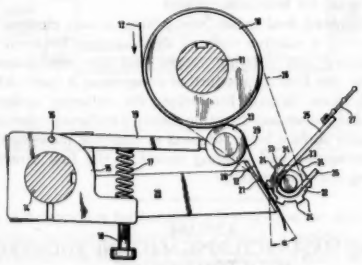
Ernst Goller, Reutlingen; Günther Kazmaier, St. Johann; Hans-Dieter Trissler, Reutlingen, and Henning Schmidt, Ohmenhausen, all of Fed. Rep. of Germany, assignors to H. Stoll GmbH & Co., Reutlingen, Fed. Rep. of Germany

Filed Jul. 27, 1983, Ser. No. 517,720

Claims priority, application Fed. Rep. of Germany, Aug. 4, 1982, 3229031

Int. Cl.³ D04B *15/88*

U.S. Cl. 66—149 R **9 Claims**



1. A fabric take-down mechanism for flat knitting machines, particularly those designed for the production of shaped knitted products, comprising a take-down roller disposed beneath the needle beds and a spring loaded press roller, characterised by an auxiliary take-down roller (22) disposed after the press roller (13) in the take-down direction and having an electrically conducted, earthed surface equipped with longitudinal edges (24), and by a smooth electrically conducting counter plate (21) which is disposed at an angle (α) to the vertical, the knitted fabric (12) passing from the counter roller (13) being conducted between the counter plate (21) and the auxiliary take-down roller (22).

4,503,690

FABRIC TAKE-DOWN MECHANISM FOR FLAT KNITTING MACHINES

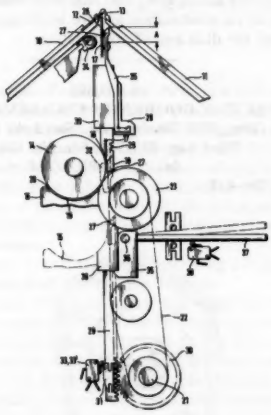
Ernst Goller, Reutlingen, and Fritz Walker, Kusterdingen, both of Fed. Rep. of Germany, assignors to H. Stoll GmbH and Company, Reutlingen, Fed. Rep. of Germany

Filed Jul. 27, 1983, Ser. No. 517,721

Claims priority, application Fed. Rep. of Germany, Aug. 4, 1983, 3229032

Int. Cl.³ D04B *15/88*

U.S. Cl. 66—149 R **8 Claims**



1. A fabric take-down mechanism for a flat knitting machine having stitch-stripping devices, the machine including first and second needle beds spaced longitudinally apart at their respective ends to define a comb gap, each bed having a plurality of transversely spaced apart needles, the mechanism comprising

at least one driven take-down roller mounted spaced below said comb gap,

a hook bar adapted to be raised and to be lowered in a take-down direction;

controllable drive means for controlling the raising and lowering of said hook bar;

take-down hooks mounted on said hook bar for engaging a knitted fabric in the space between the needle beds and said take-down roller, such that in the uppermost position of said hook bar, said take-down hooks are disposed beneath the comb gap and during the downwards movement of said hook bar, said hooks hang into the edge of the fabric.

4,503,691

COMBINATION LOCK

Hung-Wen Li, 13 Tingchu Li, Lukang Chen, Changhua Hsien, Taiwan

Filed Dec. 16, 1980, Ser. No. 217,148

Int. Cl.³ E05B *37/02, 65/52*

U.S. Cl. 70—312 **5 Claims**

1. A resettable combination lock comprising:

latch element means movable between latched and unlatched positions;

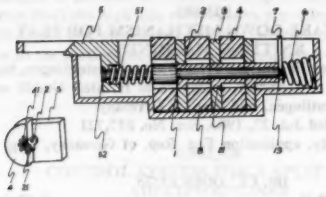
a shaft coupled to said latch element means;

a plurality of sleeves rotatably mounted on said shaft;

a plurality of dials rotatably mounted on said sleeves;

means for selectively engaging ones of said sleeves with ones of said dials; and

manually actuated means for moving said shaft and said latch element means to said unlatched position and con-



currently disengaging said engaging means when the dials are set on combination and for inhibiting such movement when the dials are off combination.

4,503,692

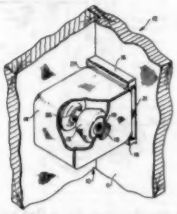
PROTECTIVE DOORKNOB ENCASEMENT DEVICE

Dean R. Grint, 5605 Goodway Dr., Salt Lake City, Utah 84107

Filed Aug. 23, 1982, Ser. No. 410,424

Int. Cl.³ E05B *17/14*

U.S. Cl. 70—418 **9 Claims**



1. A protective doorknob encasement device for enclosing a doorknob when said device is positioned so as to rest adjacent to an exterior surface of a door, comprising: a mounting plate adapted in size and configuration for attachment to a doorjam supporting the door, said plate being adapted for an approximate perpendicular orientation with respect to the door, said mounting plate including means for rigid fixation to the doorjam;

a trackguide means affixed to said mounting plate and oriented thereon for providing a track having a movement direction toward said exterior door surface;

a protective casement having a structure adapted for enclosing a doorknob at the exterior surface of said door when properly mounted on said track, said casement having (i) a first opening at a back side thereof adapted to pass around a doorknob to be enclosed and configured for close contact against said door and around said doorknob for preventing access to said doorknob by unauthorized intruders, and (ii) a second forward opening positioned in the casement so as to provide access to a key slot fo the enclosed doorknob;

means coupled to the casement and extending between respective planes containing the first and second openings, said coupling means extending along a plane at approximate right angles to said respective planes for slideably mounting said casement onto said trackguide means to enable an orientation of (i) close contact of said first casement opening with the exterior surface of said door and around said knob, and (ii) access to said key slot through said second opening; and

unidirectional advancement means coupled to said casement and including means for restricting said casement movement along said trackguide to forward tracking motion at approximate right angles to the exterior surface of the door when it is in a closed position at the doorjam.

4,503,693

APPARATUS FOR MAKING A HOLE AND A HOLE-SURROUNDING COLLAR IN THE SIDE OF A PIPE

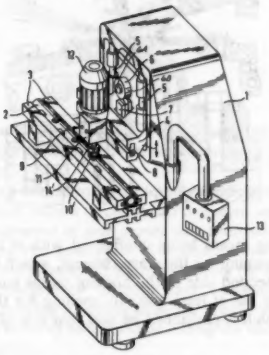
Leo Larikka, Vaasa, Finland, assignor to G.A. Serlachius Oy, Mantta, Finland

Filed Mar. 3, 1982, Ser. No. 354,292

Claims priority, application Finland, Mar. 10, 1981, 810749

Int. Cl.³ B21D *31/02*

U.S. Cl. 72—71 **15 Claims**



1. An apparatus for making a hole, having an axis, and a collar therefor in the side of a pipe, the apparatus comprising:

a stand;

pipe-fastening means mounted on the stand for holding the pipe;

means for making a hole having edges in the pipe during movement of the hole-making means in a first direction;

means for collaring the edges of the hole during movement of the collaring means in a second direction;

means mounted on the stand for mounting and rotating the hole-making means and for mounting and rotating the collaring means, the means for mounting and rotating the hole-making means being drawn by its weight, in the first direction, for hole-making; and

variable-speed feed means comprising a cam element for effecting a relative vertical displacement between the mounting and rotating means and the pipe-fastening means, the feed means further comprising a cam surface on the cam element for forcing the collaring means to move in the second direction during a collaring operation, the cam surface being adapted to limit the movement of the mounting and rotating means in the first direction during the hole-making.

4,503,694

SPRING MANUFACTURING MACHINE EQUIPPED WITH TWO MOTORS

Hiroshi Takumi, Neyagawa, Japan, assignor to Shinko Kikaikogyo Kabushiki Kaisha, Osaka, Japan

Filed Jun. 8, 1982, Ser. No. 386,216

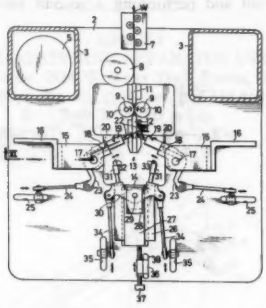
Claims priority, application Japan, Aug. 26, 1981, 56-133870; Aug. 26, 1981, 56-126124[U]

Int. Cl.³ B21F *3/00*

U.S. Cl. 72—131 **7 Claims**

1. A spring manufacturing machine which comprises wire feeding rollers, a wire feeding motor means having controllable stopping position and rotational speed, means operatively associating said rollers with said wire feeding motor means, a

tool operating motor means having controllable stopping position and rotational speed, a control unit for controlling functioning of said two motor means, a plurality of auxiliary feeding cams mounted on tool operating cam shafts rotated by said



tool operating motor means, rocking arms arranged to be subjected to rocking motion indirectly through rocking levers and being mounted on an auxiliary feeding shaft through one-way clutches, and means for transmitting rotation of said auxiliary feeding shaft to said wire feeding rollers.

4,503,695

APPARATUS FOR BENDING LAYING TUBES

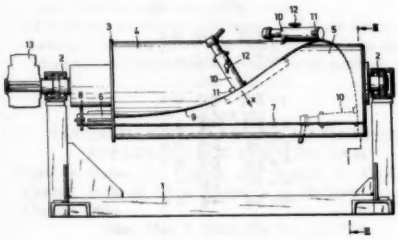
Karl-Heinz Günther, Düsseldorf, Fed. Rep. of Germany, assignor to Kocks Technik GmbH & Co., Hilden, Fed. Rep. of Germany

Filed Jul. 25, 1983, Ser. No. 517,229

Claims priority, application Fed. Rep. of Germany, Aug. 4, 1982, 3229051

Int. Cl.³ B21D *11/06*; B21F *3/04, 3/10*

U.S. Cl. 72—133 **10 Claims**



1. An apparatus for bending a laying tube for wire winding layering apparatus comprising a frame, a molding body for determining the shape of a laying tube, said body being made up of two non-circular concentric drums fixed together to form a unitary member, one inside and smaller than the other on a common horizontal axis, the outer drum having a lateral edge cut to match the lengthwise curvature of the laying tube extending lengthwise and around the drum and holding means at one end of the molding body for clamping an end section of the laying tube to said molding body, to engage and hold the laying tube on a line parallel to the axis of rotation of said molding body and means for rotating said molding body to move the lateral edge of the outer drum through the line of the laying tube to bend the same along the lateral edge.

4,503,696

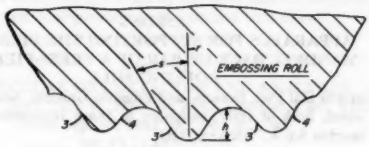
METHOD FOR THE PRODUCTION OF SPIKE-FREE SHEETS

Gerald M. Roeder, Pittsburgh, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Feb. 22, 1983, Ser. No. 468,789

Int. Cl.³ B44C *1/24*

U.S. Cl. 72—197 **7 Claims**



1. In the production of coined metal sheet, in which a coined leather-grain type decorative pattern is produced by the passage of the sheet through opposing rolls having a diameter of 10 to 30 inches, one of said rolls having a pattern thereon the cross-section of which consists of peaks and valleys, said peaks having a height above the valleys of from 0.001 to 0.005 inches, said pattern being a substantial mate of the resultant coined sheet decorative pattern, and the other roll having a comparatively smooth surface,

the improvement which comprises producing a coined sheet exhibiting enhanced paintability; wherein

the trailing sides of the peaks on said patterned roll are sloped at an angle of 25° to 75° with respect to the respective peak cross-sectional radius and during the passage of the sheet between the opposing rolls, impressing said pattern into the sheet so that the peaks formed thereon will substantially bottom into the valley portions of the patterned roll sufficient to eliminate sharp corners on the sheet peaks; said impression being such that the ratio, d/t, of the height of sheet peaks to sheet thickness is within the range 0.05 to 0.15.

4,503,697

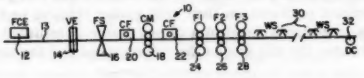
METHOD FOR HOT ROLLING SLABS

George W. Tippins, and Vladimir B. Ginzburg, both of Pittsburgh, Pa., assignors to Tippins Machinery Company, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 460,387, Jan. 25, 1983, abandoned. This application Apr. 11, 1983, Ser. No. 481,875

Int. Cl.³ B21B *41/02*

U.S. Cl. 72—202 **4 Claims**



1. A method for hot rolling slabs to strip thickness comprising:

A. close coupling by a distance less than the length of an intermediate workpiece a first and second hot reversing mill having a coiler furnace on the upstream side of said first mill with a finishing train having at least two finishing mills,

B. reducing said slab to the intermediate workpiece by passing it back and forth through at least said first hot reversing mill while maintaining roll pairs of remaining mills in an open position in a roughing mode, said slab freely passing through said remaining mills,

C. further reducing said workpiece by rolling simultaneously through the first and second hot reversing mills in tandem in an intermediate mode,

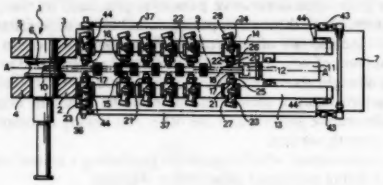
D. coiling said workpiece in said coiler furnace,
E. setting roll gaps on said roll pairs to receive the workpiece in a finishing mode,
F. decoiling and directing said workpiece in a downstream direction, and
G. reducing said workpiece to said strip thickness by rolling simultaneously through said first and second mills and said finishing train in tandem.

4,503,698

APPARATUS FOR SUPPORTING THE PIERCING MANDREL BACK-UP BAR OF A PRESS-PIERCING ROLLING MILL

Giacinto Dal Pan, Brescia, and Edgardo Gnecchi, Sesto S. Giovanni, both of Italy, assignors to Innse Innocente Santeustacchio S.p.A., Brescia, Italy

Filed May 24, 1983, Ser. No. 497,555
Claims priority, application Italy, May 28, 1982, 21547 A/82
Int. Cl.³ B21B *17/08*
U.S. Cl. 72—209 **1 Claim**



1. In a press-piercing rolling mill comprising a rolling stand defining a rolling and piercing axis, a piercing mandrel, and a mandrel back-up bar carrying the piercing mandrel and extending along said axis on the exit side of the rolling stand, apparatus for supporting and increasing the rigidity of the mandrel back-up bar, comprising:
a base disposed on the exit side of the rolling stand,
first and second lines of constraining elements extending symmetrically with respect to and parallel with the said rolling and piercing axis,
two beams respectively mounting all the constraining elements of the first line and of the second line of constraining elements, said beams extending symmetrically with respect to, and parallel with, said axis,
a respective pair of horizontal guides supporting each said beam at its end, wherein said beams are adjustable in said guides relative to the rolling axis, each of said guides extending perpendicular to the said axis and being rigidly fixed respectively to the exit side of the said rolling stand and to the said base, and
securing means for securing the beams rigidly in predetermined positions on their said guides relative to the said axis whereby to form a closed frame constituted by the beams, the exit side of the rolling stand and the said base.

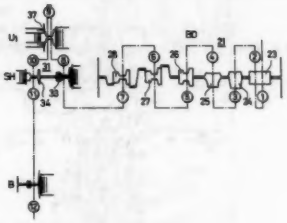
4,503,699

METHOD AND APPARATUS FOR ROLLING RAILS

Kanichi Kishikawa; Taneharu Nishino, and Seiichi Nagasoe, all of Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Jun. 27, 1983, Ser. No. 509,014
Claims priority, application Japan, Jun. 30, 1982, 57-111451
Int. Cl.³ B21B *1/08*
U.S. Cl. 72—222 **2 Claims**

1. A method of rolling rails, comprising the steps of:
performing breakdown rolling to produce a rough rolled rail;
then performing reforming rolling on the rough rolled rail in a reforming pass in a pair of horizontal rolls having a reforming pass and a head-wheel pass and a first vertical roll cooperating with the reforming pass to reduce the base of the rail therein and a second vertical roll cooperating with said head-wheel pass to reduce the head of the rail therein;
passing the rail from the reforming pass along the pass line of the reforming pass and performing a first universal rolling of the rail and performing a second universal rolling thereof;



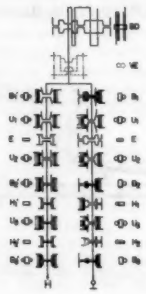
while universal rolling is being performed, shifting the horizontal rolls and said vertical rolls to match the head-wheel pass with the pass line of the second universal rolling;
performing the head-wheel rolling using said horizontal rolls and the second vertical roll for reducing the head of the rail; and
performing base-wheel rolling on the rail rolled in said head-wheel pass for finishing the rail.

4,503,700

METHOD OF ROLLING RAILS

Kanichi Kishikawa, and Taneharu Nishino, both of Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Jun. 27, 1983, Ser. No. 509,013
Claims priority, application Japan, Jun. 30, 1982, 57-111450
Int. Cl.³ B21B *1/08*
U.S. Cl. 72—225 **4 Claims**



1. A method of rolling mills from hot-rolled blooms, comprising:
breakdown rolling a bloom having a square or rectangular cross-section for breaking down the bloom to a substantially H-shaped beam blank having a cross-section symmetrical with respect to the center line of the web thereof; and
passing the thus rolled bloom successively through a plurality of universal rolling stands, a plurality of head-wheel rolling stands and a plurality of base-wheel rolling stands in only a single pass through each stand and rolling with the horizontal rolls in said base-wheel rolling stands the flange of said beam blank which corresponds to the head of the rail for widthwise reduction thereof and rolling

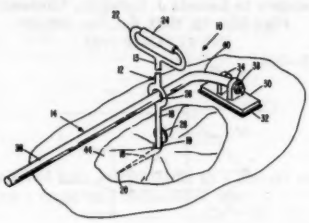
with a vertical roll thereof the flange of the beam blank which corresponds to the base of the rail for thickness reduction thereof, and rolling with a vertical roll in said head-wheel rolling stands the flange of the beam blank which corresponds to the head of the rail for thickness reduction thereof.

4,503,701

PANEL STRAIGHTENING APPARATUS AND METHOD

Michael J. Hardy, 5524 W. Sioux Trail, Peoria, Ill. 61607

Filed Sep. 15, 1983, Ser. No. 532,466
Int. Cl.³ B21D *1/12*
U.S. Cl. 72—372 **6 Claims**



1. A method of straightening a dented area in a panel surface utilizing a panel straightening apparatus having a first member and a second member, including the steps of:

(a) driving a substantially pointed spike portion of said first member into said dent by impacting an impact pad attached immediately adjacent said spike portion, said spike portion being bent at about 90 degrees relative to an attachment portion of said first member;

(b) rotating said first member to position wherein said spike portion is substantially parallel to the underside of said dented area;

(c) locating a padded base portion of said second member on said panel adjacent said dent;

(d) moving a lever portion of said second member to a first position at a first height above said panel and engaging said lever through a lever receiving aperture formed in said attachment portion, said lever portion being pivotally connected to said base portion; and

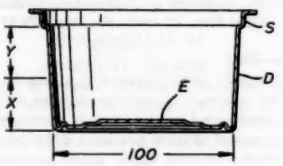
(e) applying a force to said lever, said force being directed away from said panel and being sufficient to move said dent toward alignment with said panel surface.

4,503,702

TAPERED CONTAINER AND METHOD AND APPARATUS FOR FORMING SAME

Joseph D. Bulso, Jr., Canton, and Stephen D. Doyle, North Canton, both of Ohio, assignors to Redicon Corporation, Canton, Ohio

Filed May 5, 1983, Ser. No. 491,756
Int. Cl.³ B21D *22/00*
U.S. Cl. 72—349 **12 Claims**



1. A method of forming a wrinkle free tapered container from a thin metal blank in a double acting press having inner and outer rams, comprising the steps of:

(A) forming the blank into a cup with an integral bottom surface;

(B) holding the cup with tooling carried by the outer ram;

(C) partially forming said held cup with tooling carried by the inner ram by drawing it to a partial height while imparting a tapered configuration to the portion thus drawn; and

(D) holding the cup with tooling carried by the outer ram;

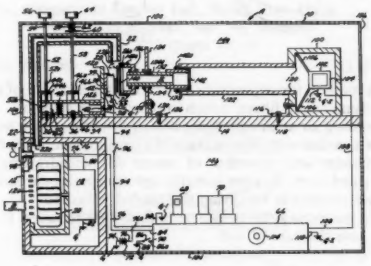
(E) finally forming said held cup by drawing it to a final height with tooling carried by the inner ram and imparting a tapered configuration to the portion thus drawn.

4,503,703

MOLECULAR GAS DETECTOR AND ANALYZER

Hayes L. Pagel, 2185 W. Hiwatha Ave., Anaheim, Calif. 92804

Filed Sep. 10, 1982, Ser. No. 413,743
Int. Cl.³ G01N *15/02*
U.S. Cl. 73—23 **12 Claims**



1. An apparatus for detecting and identifying an unknown substance not common to the ambient atmosphere, said apparatus including:

a. a housing that has a forward and rearward end;

b. a piezoelectric element having an exterior surface;

c. first means for supporting said piezoelectric element at a fixed position in said housing;

d. force receiving means operatively associated with said piezoelectric element;

e. second means for drawing a stream of air across said substance for surface active molecules of said substance to become entrained therewith, with said air stream containing said molecules being subsequently pressurized;

f. third means for discharging said pressurized air stream across said exterior surface of said piezoelectric element until a substantial quantity of said molecules have accumulated on said exterior surface thereof by electrostatic attraction thereto to vibrate said piezoelectric element for the latter to generate a first voltage of the same frequency as that of said vibrations;

g. electrically powered voltage amplifying means having a voltage imput and an amplified voltage output;

h. a loud speaker that includes an armature and a cone;

i. first electrical conducting means for delivering said first voltage to said imput;

j. second electrical conducting means for delivering said amplified voltage from said amplifier to said armature to actuate said cone to emit pulsed sound waves;

k. fourth means that vibrate in response to said pulsed sound waves;

l. fifth means for transferring said vibrations of said fourth means to said force receiving means to augment the vibrating force to which said piezoelectric element is subjected by said molecules and increase the magnitude of said first voltage; and

m. sixth means energized by the amplified voltage after said first voltage has been augmented, said sixth means indicating a frequency pattern that is related to the vibrations to which said piezoelectric element is subjected by said

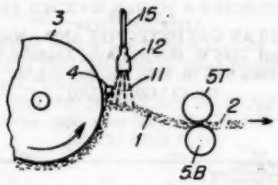
molecules, with said frequency pattern being destinctive for each of said substances being detected and identified.

4,503,704

CARD WEB STRENGTH TEST

James R. Misenheimer, Charlotte, N.C., assignor to Celanese Corporation, New York, N.Y.

Filed May 2, 1983, Ser. No. 490,650
Int. Cl.³ G01L *5/04*
U.S. Cl. 73—159 **5 Claims**



1. A method for objectively measuring the strength of a web comprising staple fibers, which comprises the steps of:

(i) passing air at an increasing rate of flow through a portion of a carded web downstream of a carding machine's doffer cylinder and upstream of means for withdrawing said carded web, thereby initially deforming the carded web and eventually rupturing the carded web; and

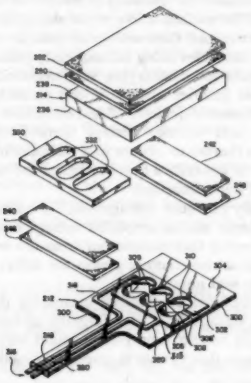
(ii) measuring the passed air's flow rate required to rupture the carded web.

4,503,705

FLEXIBLE FORCE SENSOR

Michael Polchaninoff, Huntington, N.Y., assignor to The Langer Biomechanics Group, Inc., Deer Park, N.Y.

Continuation-in-part of Ser. No. 351,961, Feb. 24, 1982, Pat. No. 4,426,884. This application Mar. 14, 1983, Ser. No. 475,085
The portion of the term of this patent subsequent to Jan. 24, 2001, has been disclaimed.
Int. Cl.³ H01C *10/10*
U.S. Cl. 73—172 **21 Claims**



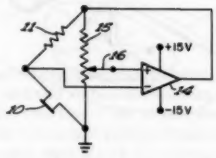
1. For use with a sensor comprising a body having spaced electrodes, a conduction sensor pad comprising a sheet of flexible conductive material having upper and lower faces and shaped to be received on said sensor body and to span the space between said electrodes, said lower face of said sheet being adapted to be secured to said sensor body and having adhesive portions to engage said body, said adhesive portions being spaced from one another at a location corresponding to the space between said electrodes, said upper face of said sheet having an adhesive portion adapted to be secured to a test site on the person of an individual.

4,503,706

CONSTANT TEMPERATURE ANEMOMETER

Kenneth J. Kolodjski, 2102 Como Ave. SE., Minneapolis, Minn. 55414, assignor to Kenneth J. Kolodjski, Minneapolis, Minn.

Filed May 16, 1983, Ser. No. 495,034
Int. Cl.³ G01F *1/68*
U.S. Cl. 73—204 **5 Claims**



1. In a constant temperature anemometer of the type having bridge circuit means including first and second leg means serially connected to each other at a first junction, third and fourth leg means serially connected to each other at a second junction and connected in parallel with said first and second leg means at a third junction between said first and fourth leg means, said first leg means including sensor means and said second, third and fourth leg means including resistance means, and also having feedback amplifier means having its inputs interconnected with said first and second junction and its output interconnected with said third junction, the improvement comprising a voltage ratioing means, power supply means and means selectively interconnecting said third and fourth leg means within said bridge circuit means and with said voltage ratioing means and said power supply means, and wherein said resistance means of said third and fourth leg means comprise potentiometer means having a wiper arm, said wiper arm establishing said second junction.

4,503,707

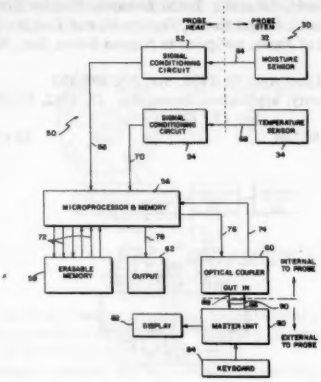
HYGROMETRY PROBE

Eugene J. Rosa, Martinez, and James B. Jerde, Scotts Valley, both of Calif., assignors to Ondyne Inc., Concord, Calif.

Filed Mar. 28, 1983, Ser. No. 479,147
Int. Cl.³ G01W *1/02*
U.S. Cl. 73—336.5 **21 Claims**

1. A hygrometry probe comprising a housing, first sensing means in the housing for sensing moisture and providing a moisture-related signal, second sensing means in the housing for sensing a second physical condition and providing a second physical condition-related signal, signal-processing means in the housing for linearizing the moisture-related signal and providing a digital moisture-related signal and a digital second physical condition-related signal, the signal-processing means including means for generating a serial data output signal

including the digital moisture-related signal and the digital second physical condition-related signal, and means for transmitting the serial data output signal to a central monitoring system along a single data transmission line.



4,503,708

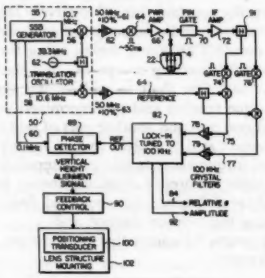
REFLECTION ACOUSTIC MICROSCOPE FOR PRECISION DIFFERENTIAL PHASE IMAGING

Gordon S. Kino, Stanford; Butrus T. Khuri-Yakub; Simon D. Bennett, both of Palo Alto, and Kenneth K. Liang, Menlo Park, all of Calif., assignors to Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.

Filed Feb. 7, 1983, Ser. No. 464,394

Int. Cl.³ G01N *29/00*

U.S. Cl. 73—628 **24 Claims**



1. In an acoustic microscope, means for measuring the surface characteristics of a sample by measuring in surface wave velocity in said sample, comprising transducer means for generating normal on-axis and off-axis rays toward a material surface; means for detecting the rays reflected from said surface in response to said normal and off-axis rays;

means for measuring the phase difference between on-axis and off-axis reflected rays to establish the surface characteristics of the material.

4,503,709

PRESSURE SENSOR

Wolfgang Rühle, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

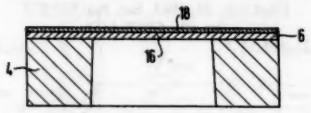
Filed Mar. 7, 1983, Ser. No. 472,489

Claims priority, application Fed. Rep. of Germany, Mar. 31, 1982, 3211968

Int. Cl.³ G01L *9/06*

U.S. Cl. 73—727 **18 Claims**

1. A pressure sensor having a semiconductor body comprising a substrate comprising a compound semiconductor and a first epitaxial layer comprising a ternary or quaternary III-V compound semiconductor wherein different conduction band minima with different effective masses are closely adjacent energywise, said epitaxial layer comprising the mixed crystal



series gallium-aluminum-arsenic having the composition $Ga_{1-x}Al_xAs$, wherein the aluminum concentration amounts to $0.19 \leqq x \leqq 0.43$.

4,503,710

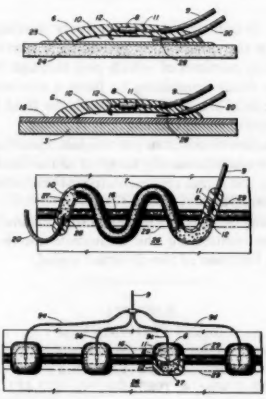
CRACK DETECTION BY ELECTRICAL RESISTANCE

Donald H. Oertle, and Randall G. Ivie, both of Ponca City, Okla., assignors to Conoco Inc., Ponca City, Okla.

Filed Jun. 8, 1983, Ser. No. 502,037

Int. Cl.³ G01N *19/08*

U.S. Cl. 73—763 **12 Claims**



1. A method for monitoring crack formation in materials in contact with liquids comprising

(A) affixing multiple liquid impermeable enclosures to the material to be monitored such that a crack forming in the monitored material will provide passage for liquid to enter the enclosures either through the monitored materials or by destroying the integrity of said liquid impermeable enclosures;

(b) sealing a resistor having a known value onto each of the enclosures, each of the resistors having one lead capable of liquid contact within the enclosure, said lead electrically isolated from the material being monitored and/or a second wire in the enclosures;

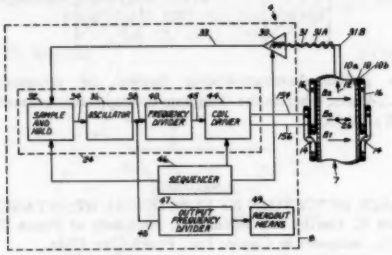
(c) forming a circuit connecting the multiple enclosures wherein opposite resistor leads from each enclosure are connected by insulated wire to means for measuring resistance and/or conductance wherein each resistor alone or together with any combination of other resistors in said enclosures within the circuit provides a unique total resistance and/or conductance value if the exposed lead becomes liquid wet, and

(d) monitoring resistance and/or conductance of the circuit, such that a crack in a monitored material will destroy the integrity of the enclosure, allowing the liquid to enter the enclosure and complete the circuit, wherein the location of each fluid filled enclosure is determined by the resistance and/or conductance measured.

4,503,711
TRAVELLING WAVE FLOWMETER

David C. Bohn, Stillwater Township, Washington County, Minn., assignor to Rosemount Inc., Eden Prairie, Minn.

Filed Sep. 30, 1983, Ser. No. 537,973
Int. Cl.³ G01F 1/58
U.S. Cl. 73—861.12 24 Claims



21. A magnetic flowmeter which senses the velocity of flow of an electrically conductive fluid through a conduit comprising:

a plurality of coil means consecutively overlappingly supported by the conduit for providing a plurality of magnetic fields, portions of which pass through the fluid, the magnetic fields combining to form a composite moving magnetic field which interacts with the fluid to induce an electromotive force therein;

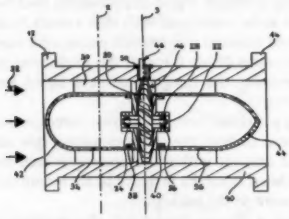
detecting means disposed in the conduit, electrically isolated therefrom and electrically coupled to the fluid for providing a detected signal representative of the induced electromotive force; and

control means coupled to the detecting means and the coil means for controlling the composite moving magnetic field as a function of the detected signal.

4,503,712
MASS FLOWMETER

Pierre Vigneaux, Maincy, France, assignor to Schlumberger Technology Corporation, New York, N.Y.

Filed Mar. 4, 1983, Ser. No. 472,422
Claims priority, application France, Mar. 5, 1982, 82 04141
Int. Cl.³ G01F 1/78
U.S. Cl. 73—861.35 14 Claims

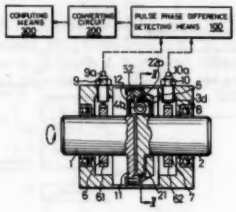


1. Apparatus for measuring the mass rate of flow of a fluid, comprising a housing forming a conduit adapted to be traversed by the fluid; a turbine comprising a rotor with a plurality of blades mounted in the conduit to be rotated by the fluid, at least two of said blades having angles of inclination a and b with respect to the turbine axis which are different and at least one of said at least two blades being elastically deformable under the action of the flowing fluid; and means for measuring a characteristic parameter of blade deformation between said at least two blades, said parameter being representative of the mass flow rate of the fluid.

4,503,713
DUAL SENSITIVITY TORQUE DETECTOR

Hideki Obayashi, Okazaki; Tokio Kohama, Nishio; Kimitaka Saito, Okazaki; Hisasi Kawai, Toyohashi, and Toshikazu Ina, Nukata, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Apr. 20, 1983, Ser. No. 486,832
Claims priority, application Japan, Apr. 22, 1982, 57-67548
Int. Cl.³ G01L 3/02
U.S. Cl. 73—862.34 10 Claims



1. A torque detector comprising:

a first shaft integrally connected to a driving shaft of an internal combustion engine so as to be rotated therewith:

a second shaft connected to a load, said second shaft being arranged so as to be coaxial with and opposed to said first shaft;

a plurality of elastic members which are interposed between said first shaft and said second shaft for transmitting the torque of said first shaft to said second shaft while being compressed between said first shaft and said second shaft;

a spring constant changing means for making the total spring constant of said elastic members relatively small until the applied torque reaches a predetermined value and making the total spring constant thereof relatively large when the applied torque exceeds the predetermined value;

said spring constant changing means being formed in said second shaft for enabling one part of said elastic members to connect said first shaft to said second shaft until the applied torque reaches said predetermined value and enabling said one part and another part of said elastic members to connect said first shaft to said second shaft when the applied torque exceeds said predetermined value;

an angular phase difference detecting means for detecting angular phase difference between said first and second shafts during the rotation thereof; and

a computing means for calculating torque from the angular phase difference.

4,503,714
ARRANGEMENT FOR NON-CONTACTING MEASUREMENT OF STATIC AND DYNAMIC TORQUES

Horst Winterhoff, Dreieich, Fed. Rep. of Germany, assignor to Licentia Patent-Verwaltungs-GmbH, Frankfurt am Main, Fed. Rep. of Germany

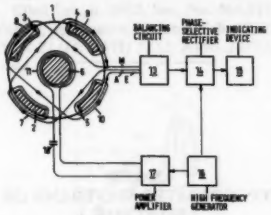
Filed Feb. 17, 1983, Ser. No. 467,471
Claims priority, application Fed. Rep. of Germany, Feb. 19, 1982, 3206008
Int. Cl.³ G01L 3/10
U.S. Cl. 73—862.36 5 Claims

1. A torque sensor arrangement for the non-contacting measurement of static and dynamic torques produced in a test object, such torques causing a permeability change in the surface of the test object, comprising:

a signal generator for producing an exciting signal having a predetermined exciting frequency;

a pot-shaped magnetic yoke constituting a probe, said yoke having an edge and four pole members located at said edge, each said pole member having a pole surface opposite the surface of the test object;

a plurality of measuring windings each supported by a respective one of said pole members, said measuring windings being connected to form a magnetic bridge and producing a measuring signal at an output of said bridge;



an exciting winding connected to said signal generator and supported by said yoke for reversing the magnitization of the test object to saturation; and

a capacitor connected to said exciting winding to form with said exciting winding a resonant oscillatory circuit tuned to the exciting frequency.

4,503,715

LOAD SENSORS

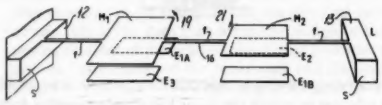
John C. Greenwood, Harlow, England, assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Feb. 8, 1983, Ser. No. 464,812

Claims priority, application United Kingdom, Feb. 9, 1982, 8203646

Int. Cl.³ G01L *1/10*

U.S. Cl. 73—862.59 **3 Claims**



1. A load sensor comprising: first and second supports; first and second plates thin in comparison to their lengths and widths; first and second filament portions supporting said first and second plates, respectively, from said first and second supports, respectively, on a common axis, said first and second plates being essentially in planes through said common axis and being symmetrical about said common axis; and a third filament portion connecting said first and second plates on said common axis, all of said filament portions being on said common axis, such of said filament portions having a cross section small in comparison to the lengths and widths of said plates, said plates being oscillatory simultaneously in opposite directions about said common axis at a resonant frequency which is proportional to the tensile strain on said filament portions.

4,503,716

MOLTEN METAL SAMPLER

Hartmut Wuensch, Eichendorffstr. 7, D4020 Mettmann, Fed. Rep. of Germany

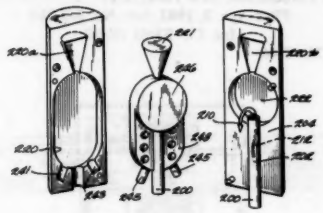
Filed Jan. 27, 1983, Ser. No. 461,284

Claims priority, application Fed. Rep. of Germany, Feb. 2, 1982, 3203505

Int. Cl.³ G01N *1/12*

U.S. Cl. 73—864.57 **6 Claims**

1. A molten metal sampler including opposed mold halves, said mold halves including cooperating recesses to form a fill passage having a sample inlet and communicating with relatively thick disc sample portion recesses and a recess in one of said mold halves to form a relatively thin skirt sample portion extending from said disc sample portion toward said inlet so that when the sampler is in use the skirt portion recess will be filled prior to the disc portion, said skirt sample portion having



at least one wall co-extensive and co-planar with said disc portion and being formed by a wall which extends continuously along one side of the disc portion and skirt portion.

4,503,717

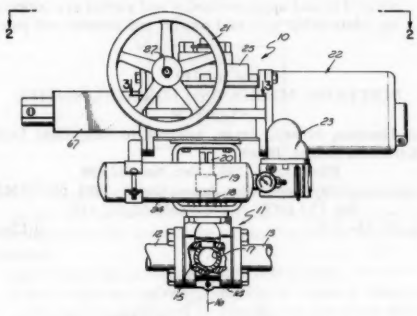
SHOCK ACTUATED UNIT

William F. Keller, West Covina, and Richard D. Sibley, Anaheim, both of Calif., assignors to Koso International, Inc., Sante Fe Springs, Calif.

Filed Sep. 20, 1982, Ser. No. 420,008

Int. Cl.³ G05G *17/00;* **F16K** *17/36, 31/53*

U.S. Cl. 74—2 **18 Claims**



1. A seismic actuator comprising:

a controlled element to be actuated to different positions within a range of movement;

a power actuated unit for moving said controlled element;

a manually actuated handle for moving said controlled element and which is positioned to be engaged and moved by an operator's hands;

a differential gear mechanism having an output connected to said controlled element to actuate it, a first input connected to said handle for manual actuation of said element by said handle through said differential gear mechanism, and a second input connected to said power actuated unit for actuation of said element by said unit through said differential gear mechanism; and

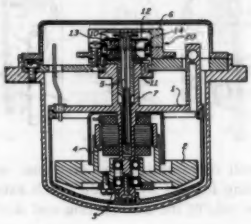
shock responsive means operable automatically when subjected to mechanical shock forces to cause actuation of said controlled element by said power actuated unit.

4,503,718

AZIMUTH DETERMINING GYROSCOPE

Thomas R. Quermann, Huntington Station, N.Y., assignor to Sperry Corporation, New York, N.Y.

Filed Apr. 2, 1982, Ser. No. 365,052
Int. Cl.[3] F16D 19/30
U.S. Cl. 74—5.46 9 Claims



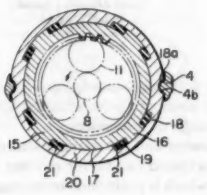
1. A gyroscope comprising:
a case;
mechanically balanced gimbal means having lower and upper surfaces;
means for suspending said gimbal means from said case;
a spin motor, coupled to said lower surface of said gimbal means, having a wheel coupled thereto for spinning about a vertical axis, and
means, coupled to said upper surface of said gimbal means, for measuring positions of said gimbal means with respect to said case and for providing torque to said gimbal means to precess said wheel, said measuring and torqueing means including:
a plurality of pickoff and torquer coil pairs disposed along orthogonal axes of said measuring and torqueing means; and
a plurality of plates, having magnets disposed therebetween coupled to said upper surface of said gimbal in a cooperating relationship with said pickoff and torquer coil pairs.

4,503,719

BUFFERING MECHANISM FOR AUTOMOTIVE STARTER

Isao Hamano, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Oct. 5, 1982, Ser. No. 432,808
Claims priority, application Japan, Oct. 9, 1981, 56-150243
Int. Cl.[3] F02N 15/04; F16H 57/08, 1/32
U.S. Cl. 74—7 E 1 Claim



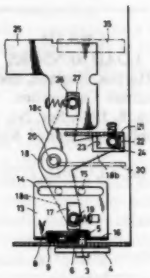
1. In an automotive starter including a planetary gear speed reduction mechanism between a motor and a pinion torque transmission system, the improvement comprising a machine frame for said system having front and rear halves, a ring gear engaging the inner periphery of said front and rear halves of said frame, a buffering mechanism for said automotive starter including elastic members provided in spaces defined between circumferentially opposed sides of depressions formed in axially divided one half of the outer periphery of said ring gear and depressions formed in the inner periphery of the corresponding half of the machine frame, the other axial half of the ring gear outer periphery being smoothly fitted in the other machine frame half.

4,503,720

PUSHBUTTON-OPERATED WAVEBAND OR STATION SELECTOR

Takao Chaki, Tokyo, Japan, assignor to Clarion Co., Ltd., Tokyo, Japan

Filed Mar. 24, 1982, Ser. No. 361,170
Claims priority, application Japan, Mar. 31, 1981, 56-47857
Int. Cl.[3] F16H 35/18; H03J 5/06
U.S. Cl. 74—10.33 4 Claims



1. In a tuner having a pushbutton-operated waveband or station selector in which the tuner has pushbuttons for making station selections, a rotatable tuning knob for making station selections alternatively with the pushbuttons, tuning coil means and tuning core means movable in said tuning coil means and operable by the pushbuttons and the tuning knob for tuning in stations, the combination coprising: a slidable memory plate movable back and forth in a first directiion between a plurality of positions which are selectable by operation of said pushbuttons, said first direction extending laterally to the direction of movement of the pushbuttons, and a first elongated guide portion on said memory plate and extending perpendicular to said first direction; a slidable core slide connected to the tuning core means and movable back and forth in a second direction for tuning in stations, said second direction being different from said first direction, and a second elongated guide portion on said core slide and extending perpendicular to said second direction; a slidable idler plate movable in said first direction in response to rotation of the tuning knob, and a third elongated guide portion on said idler plate and extending perpendicular to said first direction; a link having first, second and third arms and means mounting said link for pivotal movement on said tuner, each of said arms having a guide member thereon spaced outwardly from the pivot axis of said link, the guide member on said first arm being slidably received in said third guide portion, the guide member on said second arm being slidably received in said second guide portion and the guide member on said third arm being slidably received in said first guide portion so that movement of said memory plate or said idler plate in the first direction will pivot the link and thereby effect movementof said core slide in the second direction.

4,503,721

VALVE ACTUATOR FOR A DOSING PUMP FOR A PAINT TONING MACHINE

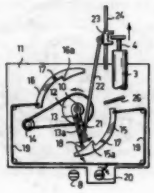
Esko Hietanen, Pori, and Pentti Airaksinen, Ulvila, both of Finland, assignors to Oy W. Rosenlew AB, Finland

Filed Feb. 8, 1983, Ser. No. 464,917

Claims priority, application Finland, Feb. 10, 1982, 820433

Int. Cl.³ F16H *21/16*; B67D *5/52*; A47G *19/12*; E03B *5/00*

U.S. Cl. 74—44 **5 Claims**



1. A valve actuator for a dosing pump for a paint toning machine, wherein the dosing pumps (3) are mounted in a sled (9) movable with respect to the frame (11) of the machine and a dosing device (21–24) displacing the pistons (4) of the dosing pumps and an actuator rotating the valves (8) of the dosing pumps are mounted in the frame, said actuator being provided with a grap (20) rotatable between a valve-closing position and a valve-opening position, characterized in that the actuator comprises

a crank (13) rotatably mounted in the frame (11), and

two cam rods (15, 16) which are pivotally mounted in the frame and of which one is located in the path of movement of the crank and the other is provided with a transfer mechanism (25) for transferring the cam rod optionally into and out of the path of movement of the crank,

the cam rods (15, 16) being connected to the grap (20) rotatably mounted in the frame so that the pivoting movement of one (15) of the cam rods under the action of the crank causes rotation of the grab to one of said positions and the pivoting movement of the other cam rod (16) under the action of the crank causes rotation of the grab to the other one of said positions.

4,503,722

ARM OPERATING DEVICE IN AUTOMATIC OPERATING MACHINE

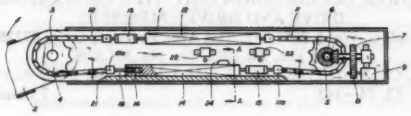
Takeo Suzuki; Itsuro Matsumoto; Yoshihiro Yurita, and Hideharu Zenpo, all of Kitakyushu, Japan, assignors to Kabushiki Kaisha Yaskawa Denki Seisakusho, Fukuoka, Japan

Continuation-in-part of Ser. No. 122,348, Feb. 19, 1980, abandoned. This application Mar. 29, 1982, Ser. No. 362,810

Int. Cl.³ F16H *21/44*

U.S. Cl. 74—96 **3 Claims**

1. An arm or wrist operating device for an automatic operating machine, said operating device including a supporting arm, a bending arm which is rotatably supported on said supporting arm, and drive means for turning said bending arm, wherein the drive means incorporates a driving wheel, a driven wheel, first and second wrapping power transmission belts laid over said driving wheel and said driven wheel respectively, first and second transmission rods, one end of said first wrapping power transmission belt being coupled through said first transmission rod to one end of said second wrapping power transmission belt, and the other end of said first wrapping power transmission belt being coupled through said second transmission rod and a tension device to the other end of said second wrapping power transmission belt, said tension device incorporating a connecting rod, one end of which is connected to the second transmission belt and the other end of which is accommodated in a hollow end of the second transmission rod and is coupled thereto by a spring dashpot assembly, and a guide supporting said second transmission rod for sliding movement, said guide being located on the inner wall of said supporting arm in such a manner that the centers of coupling pins adapted to couple the wrapping connector power transmission belts to said second transmission rod are positioned inwardly of a line tangent



to the minimum pitch circles of said wheel, each said wrapping power transmission belt having slack adjusting means and being made as short as possible according to a predetermined rotational operation range.

4,503,723

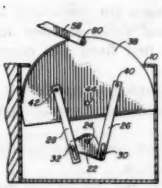
GATE OPERATOR APPARATUS

James B. Reid, Phoenix, Ariz., assignor to John Edward Jennings, Scottsdale, Ariz.

Filed Jan. 31, 1983, Ser. No. 462,147

Int. Cl.³ G05G *1/04*; F16H *21/44*

U.S. Cl. 74—96 **20 Claims**



1. A dual four bar mechanism for translating a first torque to a second torque wherein the second torque is a non-linear function of the first torque, the mechanism comprising in combination:

input means for actuation by the first torque;

a dual input member, said dual input member being connected to and adapted for rotation by said input means;

a first linkage element having a pivot and a slot along an axis of said first linkage element, said pivot and slot of said first linkage element being positioned at a first predetermined distance each from the other;

a second linkage element having a pivot and a slot along an axis of said second linkage element, said pivot and slot of said second linkage element being positioned at a second predetermined distance each from the other;

output means adapted for providing a torque to a rotary output device, one of said pivot and said slot of said first linkage element being engaged with a first pivot point of said output means, one of said pivot and said slot of said second linkage element being engaged with a second pivot point of said output means, the other of said pivot and said slot of said first linkage element being engaged with a first driving point on said dual input member and the other of said pivot and said slot of said second linkage element being engaged with a second driving point on said dual

input member, said pivots of said linkages being pivotably engaged with their respective pivot points on one of said input member and said output means and said slots being both pivotably and slidingly engaged with their respective pivot points on the other of said input member and said output means.

4,503,724

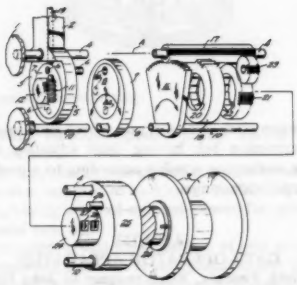
POWER TRANSMISSION UNIT WITH OSCILLATING DRIVE AND DRIVEN MEMBERS

Russell G. Ward, 2050 SW. 71st Ave., Portland, Oreg. 97225

Filed Feb. 24, 1982, Ser. No. 351,878

Int. Cl.³ F16H *27/02*; B62M *1/14*; G10K *11/00*; F16D *41/04*

U.S. Cl. 74—143 **7 Claims**



1. A power transmission unit for converting oscillating motion to rotary motion and comprising,

a drive member,.

powered lever means for imparting oscillatory arcuate movement to said drive member for powered travel thereof about a first fixed axis constituting a primary fulcrum,

a driven member adapted for oscillatory arcuate movement about a second fixed axis in parallel spaced relationship to said first axis,

said drive member and said driven member each including a disk journaled therein,

drive means coupling the disk of said drive member to the disk of said driven member and acting as a secondary fulcrum,

oscillating gear means coupled to said driven member,

ratchet means driven by said gear means, and

an output shaft driven by said ratchet means in a unidirectional incemental manner.

4,503,725

BRACING DEVICE FOR MACHINE TOOLS

Bernhard Stahl, Neunkirchen, and Horst Böhm, Siegen, both of Fed. Rep. of Germany, assignors to Firma Optima-Spanntechnik GmbH, Siegen, Fed. Rep. of Germany

Filed Aug. 18, 1982, Ser. No. 409,185

Claims priority, application Fed. Rep. of Germany, Feb. 15, 1982, 8204128

Int. Cl.³ F16H *1/16, 1/20*; B25B *1/10, 5/10*

U.S. Cl. 74—424.8 B **9 Claims**

1. A bracing device for machine tools comprising:

a housing bottom member having a first housing part firmly connected thereto, said first housing part having internal threads therein;

a first threaded bolt member having threads formed therein engaging with said first housing part;

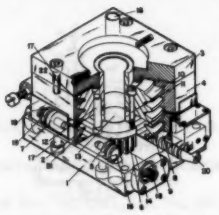
a second housing part having internal threads therein;

a housing top member firmly connected with said second housing part;

a second threaded bolt member having threads formed therein engaging with said second housing part;

said threads in said second bolt member having a different lead than said threads in said first bolt member;

a pinion member rotatably supported in said housing bottom member which interacts with said first and said second threaded bolt members;



hydraulic rotary drive means including a drive rack engaging with said pinion member and a hydraulic drive mechanism acting on both sides of said pinion to effect actuation thereof; and

an axial bore extending through said housing bottom member and said housing top member as well as through said pinion member;

said axial bore having a tie rod which is connected to a bracing head member extending therethrough.

4,503,726

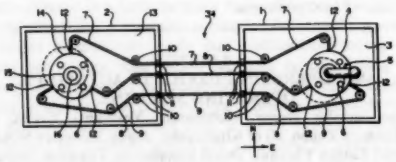
SELF-TENSIONING MOTOR TRANSMISSION CONTROL SYSTEM

Edward A. Green, Mantua, Ohio, assignor to Eaton Corporation, Cleveland, Ohio

Filed Jun. 18, 1981, Ser. No. 274,912

Int. Cl.³ B60K *20/04*

U.S. Cl. 74—473 R **16 Claims**



1. A self-tensioning control system for controlling the position of a transmission gear change mechanism, said system comprising;

a first support member having a surface oriented along a plane,

a driver member moveably engaged with said first support member,

manual control means operably engaged with said driver member and adapted to move and position said drive member into any one of a plurality of predetermined gear positions,

a second support member having a surface oriented along a plane,

a driven member moveably engaged with said second support member, said driven member operably connected to said transmission gear change mechanism in such a manner as to cause said transmission gear change mechanism to change the gear position in the manner desired in response to the movement of the driven member,

at least said driven member moveably engaged with said second support member in such a manner as to be substantially limited to move in any direction along a second plane substantially parallel to the surface plane,

a plurality of flexible force transmitting members individually connecting said driver and said driven members together and adapted to move and position said driven member in a predetermined manner in response to the movement of said driver member,

said force transmitting members connected to said driver and said driven members in such a manner that only tensioned pulling forces are applied respectively thereto in response to movement and positioning of said driver member in any one of said plurality of gear positions by said manual control means.

4,503,727

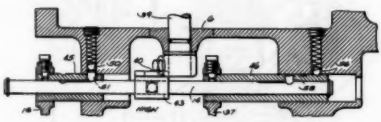
TRANSMISSION SHIFT MECHANISM

Gerardus M. Ballendux, Waukesha, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Sep. 30, 1982, Ser. No. 430,014

Int. Cl.³ G05G *5/10, 9/00;* **F16H** *37/00, 3/08*

U.S. Cl. 74—477 **9 Claims**



1. In combination with a first change speed transmission mechanism having a pair of coaxial rotary outputs and a second change speed transmission having, a housing, an input shaft coaxial with said rotary outputs, an output shaft and range gearing, a shift mechanism comprising:

a first clutch collar coaxial with the input shaft of said second transmission and axially shiftable between a first position in which said one of said rotary outputs is connected in driving relation to said input shaft and a second position in which the other of said rotary outputs is connected in driving relation to said input shaft,

a first shift fork in cooperative engagement with said first clutch collar and including a sleeve mounted on said housing for reciprocating movement in a direction parallel to the axis of said input shaft between first and second positions corresponding to said first and second positions of said first clutch collar, said sleeve presenting a radially inward facing cylindrical surface defining a cylindrical opening whose axis is parallel to said input shaft,

a second clutch collar operatively associated with said range gearing and shiftable in a direction parallel to said input shaft to and from a neutral position and first and second clutch engaged positions,

a second shift fork in cooperative engagement with said second clutch collar and including a sleeve mounted on said housing for reciprocating movement in said direction parallel to said input shaft between a neutral position and first and second clutch engaged positions corresponding to said neutral, first and second positions of said clutch collar, said sleeve presenting a radially inward facing cylindrical surface defining a cylindrical opening coaxial with said axis of said cylindrical opening of said sleeve of said first shift fork,

a shift rod having axially spaced cylindrical portions supported by said surfaces defining said openings of said sleeves and axially shiftable relative to the latter, said shift rod being reciprocatively supported by said sleeves and being axially shiftable relative to said housing between first, second, third and fourth positions of adjustment,

a first interlock mechanism operatively associated with said housing, with said sleeve of said first shift fork and with said cylindrical portion of said shift rod disposed within said opening of said sleeve of said first shift fork, and

a second interlock mechanism operatively associated with said housing, with said sleeve of said second shift fork and with said cylindrical portion of said shift rod disposed within said opening of said sleeve of said second shift fork,

said first interlock mechanism, shift rod and first clutch collar cooperating to cause said first clutch collar to be in its first position when said shift rod is in its first, second and third positions and to cause said first clutch collar to be in its second position when said shift rod is in its fourth position,

said second interlock mechanism, shift rod and second clutch collar cooperating to cause said second clutch collar to be in its first clutch engaged position when said shift rod is in its first position, to be in its clutch disengaged position when said shift rod is in its second position of adjustment and to be in its second clutch engaged position when said shift rod is in its third and fourth positions of adjustment.

4,503,728

STOP DEVICE

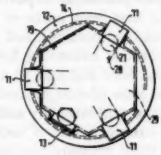
Günter Fischer, Freiberg; Wolfgang Kötter, Markgroeningen, and Robert Laschke, Reifenberg, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Sep. 29, 1982, Ser. No. 427,263

Claims priority, application Fed. Rep. of Germany, Oct. 28, 1981, 3142617

Int. Cl.³ G05G *1/04*

U.S. Cl. 74—527 **5 Claims**



1. A stop device for an axially displaceable member such as a sliding spool of a directional control valve, a drilling spindle, and the like, comprising at least two engaging elements guided in said member for movement transverse to the direction of displacement of the member; at least two securing units arranged parallel to each other in the direction of displacement of the member and cooperating with said engaging elements to stop said member in predetermined position; means for positively locking said securing units relative to each other to form a fixed guiding part for said member; each securing unit being in the form of an elongated notched plate having one elongated side formed with securing notches directed transversely to the elongated side; a side of said elongated notched plate opposite to said notches being formed with locking recesses; said locking means including at least one supporting member surrounding said securing units and said axially movable member; and said supporting member being assembled of at least two holding rings each having an inner side formed with locking recesses matching the locking recesses in said securing units.

4,503,729

DROP TYPE HANDLE FOR A BICYCLE

Keizo Shimano, Sakai, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan

Filed Feb. 26, 1981, Ser. No. 238,646

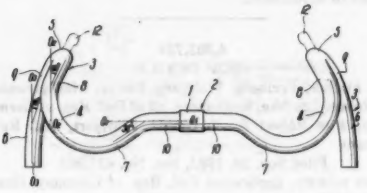
Claims priority, application Japan, Jul. 28, 1980, 55-106565[U]

Int. Cl.³ B62K *21/12*

U.S. Cl. 74—551.1 **10 Claims**

1. In a drop type handle for a bicycle comprising a first bar body which has at its central portion a mounting portion for a handle stem and extends horizontally outwardly from both

sides of said mounting portion, and a second pair of bar bodies which are formed in continuation of both lengthwise ends of said first bar body, the improvement wherein, when said handle is mounted on a handle stem of a bicycle in proper operating position for a drop type handle, said first bar body has at both lengthwise sides thereof first gripping portions, each of said first gripping portions being inclined at its lengthwise outer end in a direction rearwardly and downwardly with respect to said mounting portion and to first straight portions in continuation of said mounting portion, and said second bar bodies have first bent portions which are formed in continuation of both lengthwise ends of said first bar body and extend forwardly along a curve, second bent portions which are formed in continuation of foremost ends of said first bent



portions and curved downwardly and rearwardly thereform, second straight portions which are formed in continuation of lower rear ends of said second bent portions respectively, second gripping portions positioned at portions extending from front portions of said first bent portions to upper rear end portions of said second bent portions, and third gripping portions positioned at portions extending from lower rear end portions of said second bent portions to said second straight portions respectively, each of said second gripping portions being inclined at its front side inwardly and downwardly with respect to a forward extension line of each of said first bent portions, each of said third gripping portions being inclined at its front side inwardly with respect to a rearward extension line of each of said second straight portions.

4,503,730

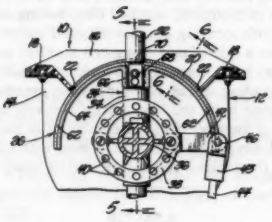
LEVER CONTROL ASSEMBLY

John E. Irvin, Collegeville, Pa., assignor to Teleflex Incorporated, Limerick, Pa.

Filed Nov. 26, 1982, Ser. No. 444,602

Int. Cl.³ G05G *1/00*; F16J *15/50*

U.S. Cl. 74—566 **8 Claims**



1. A lever control assembly comprising: housing means adapted for attachment to a support structure and including a slot having oppositely disposed tracks defining a length of said slot and an edge between each end of said tracks defining a width of said slot; actuator means extending through said slot and being movably supported by said housing means for movement along said slot; slot closure means mounted on said actuator means; and mounting means for pivotally mounting said actuator means on said housing and including a pivot axis, said tracks being semicircular and defining a first arc circumscribed about said pivot axis, said slot closure means including a flexible arcuate portion including a upper surface, said flexible arcuate portion being internally stressed along its entire length radially urging it toward a second arc flatter than said first arc to perfect a slidable seal with said upper surface engaging with and conforming to said tracks and edges to close said slot while moving with said actuator means along said slot.

4,503,731

A.F.C. DRIVE GEARBOX

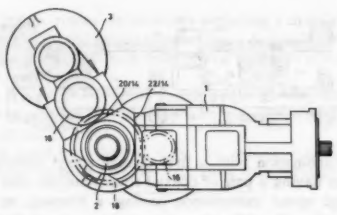
James E. Tomlinson, Pog Moor, England, assignor to Anderson Strathclyde PLC, Glasgow, Scotland

PCT No. PCT/GB81/00188, § 371 Date May 6, 1982, § 102(e) Date May 6, 1982, PCT Pub. No. WO82/01050, PCT Pub. Date Apr. 1, 1982

PCT Filed Sep. 14, 1981, Ser. No. 377,201

Int. Cl.³ F16H *57/02, 37/06*; E21C *27/32*

U.S. Cl. 74—606 R **3 Claims**



1. A drive gearbox for use in driving an armoured face conveyor adaptable as an in-line gearbox wherein the gearbox has a main axis parallel with the conveyor and adaptable as a right angled gearbox wherein the main axis of the gearbox lies at right angles to the conveyor, said drive gearbox comprising an output casing having interfaces which expose gearing for optional attachments and cover means to close off an interface not in use, and a plurality of supplementary transmission casings for attachment to the output casing also having an open interface exposing gearing, the supplementary transmission casing being a primary box having an input shaft and an output gearing, the output gearing having an axis at right angles to the input shaft thereof for coupling to the output casing to form an in-line gearbox, and a right-angled primary box having an input shaft and an output gearing, the output gearing having an axis parallel with the input shaft thereof for coupling to the output casing to form a right angled gearbox, at least one of which primary boxes is coupled to the output casing to form one of an in-line gearbox and a right-angled gearbox, and the open interfaces of the output casing being disposed in planes at an acute angle relative to each other.

4,503,732

WINDOW LIFTER DRIVE FOR MOTOR VEHICLES AND THE LIKE

Gerhard Schust, Weidhausen, Fed. Rep. of Germany, assignor to Brose Fahrzeugteile GmbH & Co., Coburg, Fed. Rep. of Germany

Filed Nov. 4, 1982, Ser. No. 439,301

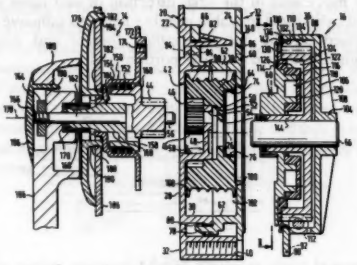
Claims priority, application Fed. Rep. of Germany, Dec. 8, 1981, 3148523

Int. Cl.³ G05G *1/08*

U.S. Cl. 74—625 **27 Claims**

1. Window lifter drive such as used in motor vehicles, comprising a housing and a driving member mounted in said housing and having an axis of rotation, said housing having a first side wall on one side of the housing and second side wall on the opposite side of the housing, a manual crank handle drive being selectively securable to said first side wall in permanent driving engagement with said driving member, and a motor drive

being selectively securable to said second side wall in permanent driving engagement with said driving member, whereby a manually operable window lifter drive is obtainable by only securing said manual crank handle drive to said housing and a motor operable window lifter drive is obtainable by only securing said motor drive to said housing, said crank handle drive includes a pinion selectively engageable with said driving member, a crank handle, and a clutch connecting said crank handle and said pinion, said clutch comprising a loop spring brake, said clutch including a first clutch part rigidly connected with said pinion and a second clutch part rigidly connected with said crank handle, said loop spring brake includes a loop spring brake jacket fixed to said housing, a bearing section is fastened to said loop spring brake jacket, said driving member comprises a cable drum having a central recess therein, said bearing section projects into said central recess in said cable drum, said crank handle drive includes a pinion extending into said central recess and rotatably supported in said bearing section, said bearing section having an opening therethrough, said crank handle drive including a pinion pin disposed in axial alignment with and supported in the opening in said bearing section, and said pinion is rotatably supported on said pinion pin.



4,503,733

CREEP PHENOMENON PREVENTIVE DEVICE FOR AUTOMATIC TRANSMISSION GEAR TYPE AUTOMOBILE

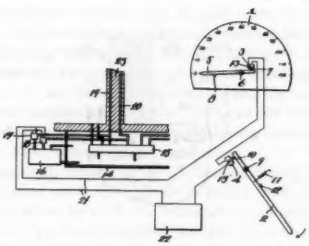
Masao Hasegawa, 4474 Toyooka, Ryuyo-cho, Iwata-gun, Shizuoka-ken, Japan

Filed Sep. 28, 1982, Ser. No. 425,627

Claims priority, application Japan, Nov. 5, 1981, 56-178024

Int. Cl.³ B60K *41/18*

U.S. Cl. 74—865 **2 Claims**



1. A creep preventing system for automatic transmission type automobiles having an accelerator pedal, speed meter, forward and reverse clutches, planetary gear, and hydraulic fluid control circuits to operate the clutches comprising:

an electric switch mounted in position to be closed by the accelerator pedal when said pedal is in an idle position;

an electric switch mounted in position to be closed by the speed meter when said speed meter is in the zero position;

a reservoir for the hydraulic fluid;

an electromagnetically operated valve operatively connected between the fluid control circuit for the forward clutch and said reservoir to bypass fluid pressure in said fluid circuit to said reservoir when actuated;

an electromagnetically operated valve operatively connected between the fluid control circuit for the reverse clutch and said reservoir to bypass fluid pressure in said reverse clutch fluid circuit to said reservoir when actuated;

a source of electrical power;

an electric valve circuit operatively connecting said electromagnetic valves in parallel; and

an electric circuit operatively connecting said switches, power source and electric valve circuit in series; so that when said accelerator pedal is in the idle position and said speed meter is in the zero position said switches close said electrical circuits to actuate said valves.

4,503,734

CONTROL SYSTEM FOR VEHICULAR FRICTION-TYPE TRANSMISSION CLUTCH

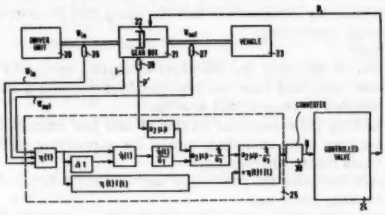
Bernd Acker, Esslingen, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Jul. 27, 1982, Ser. No. 402,235

Claims priority, application Fed. Rep. of Germany, Jul. 28, 1981, 3129681

Int. Cl.³ B60K *41/22*

U.S. Cl. 74—866 **5 Claims**



1. An arrangement for regulating a torque transmitted by friction-type gear-shifting means in a change-speed transmission means, wherein a gear shifting is accomplished under a load, the gear shifting means including a multiplate friction clutch means, the arrangement comprising a first sensor means for sensing an input speed of the transmission means and for providing an output signal of a sensed input speed, a second sensor means for sensing an output signal of the transmission means and for providing an output signal of the sensed output speed, characterized in that a third sensor means is arranged at the transmission means for sensing an operating pressure of an operating fluid of the friction clutch means and for providing an output signal of a sensed operating pressure, and in that a control means is provided for receiving, as an input, the output signals of the first, second, and third sensor means and for generating, within a presetable gear shifting time, an output signal for the operating pressure of the friction clutch means which satisfies the following relationship: for $o<t<T$,

$$U(t)=a_2\mu p(t)-1/a_1\eta(t)+f(t)\eta(t),$$

wherein:

T=a duration of the gear shifting operation, that is, a gear-shifting time,

t=a point in time during the gear-shifting operation, that is, $0 \leqq t \leqq T$;

p(t)=the operating pressure at the point in time t;

a_1, a_2=constants specified in advance;

μ=a coefficient of friction of the friction clutch means;
$\eta(t)$=a relative rotational speed between plates of the multiplate friction clutch means at the point in time t;
$\eta(t)$=a differential, with respect to time, of a relative rotational speed at a point in time t; and
f(t)=a continuous function, specified in advance, satisfying the following relationship:

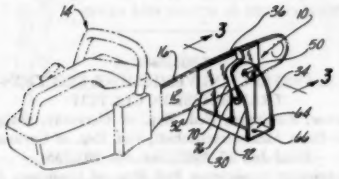
$$f(0)\eta(0)=f(T)\eta(T)=0.$$

4,503,735

CHAIN SAW SHARPENING DEVICE

Robert C. Jackson, Armada, Mich., assignor to Bebco Experimental and Manufacturing Company, Romeo, Mich.

Filed Sep. 30, 1982, Ser. No. 430,995
Int. Cl.³ B23D *63/00*
U.S. Cl. 76—78 R **4 Claims**



1. A clamp for use in sharpening a saw chain, said saw chain having a plurality of saw teeth each of said teeth having a surface which is transverse to a predetermined direction, said chain movably mounted to a saw bar along said predetermined direction, comprising:
a base;
a pair of opposing jaw members extending upwardly from said base, said base and jaw members forming a channel adapted to receive said saw bar;
a backing plate mounted on one of said jaw members, said backing plate including means for supporting said saw chain during sharpening;
means for fixing the position of said saw bar relative to said backing plate; and
means engageable with said saw chain for holding said saw chain in a fixed position relative to said backing plate,
wherein said holding means comprises an elongated arm having one end pivotally attached to a mid point the other jaw member about an axis spaced from and substantially parallel to said predetermined direction, said arm being pivotal between a first position in which the other end of said arm is spaced from said saw chain and a second position in which the other end of said arm abuts against said transverse surface of one of said teeth.

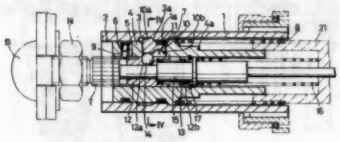
4,503,736

BOLT TIGHTENING TOOL

Fusao Fushiya, and Kazuyuki Miyamoto, both of Anjo, Japan, assignors to Makita Electric Works, Ltd., Aichi, Japan

Filed Mar. 10, 1983, Ser. No. 473,961
Claims priority, application Japan, Mar. 16, 1982, 57-37247[U]; May 28, 1982, 57-79232[U]; Jul. 14, 1982, 57-107172[U]
Int. Cl.³ B25B *17/00*
U.S. Cl. 81—55 **2 Claims**

1. A bolt tightening tool for tightening a nut onto a bolt, of the type driven by an electric motor, comprising:
an outer sleeve adapted to receive a nut for rotational drive therewith, said outer sleeve having an engaging section provided on the inner periphery thereof;
an inner sleeve adapted to receive a bolt-tip formed at the extreme end of a bolt, said inner sleeve being mounted within said outer sleeve and effective to move axially therein, said inner sleeve having a window portion provided in and extending radially therethrough for selective alignment with said engaging section;
an engaging member in said window portion and mounted for radial movement therein relative to said inner sleeve, said engaging member having a pawl portion formed on the radial outer surface thereof for engagement with said engaging section of said outer sleeve upon radial outward movement of said engaging member and a substantially semi-cylindrical recess portion formed on the radial inner surface thereof;
a cylindrical movable member in said inner sleeve mounted for movement in the axial direction of said inner sleeve, said cylindrical movable member having a concave recess formed on the outer periphery thereof and generally aligned with said window portion; and



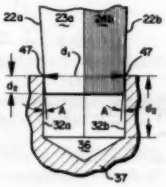
a spherical body received in said concave recess of said cylindrical member and axially movable with said cylindrical member and along said window portion, said spherical body projecting into said window portion for engagement with and radial movement of said engaging member in response to axial movement of said spherical body;
whereby when said spherical body is axially retracted with said cylindrical movable member pushed by a bolt-tip, the other portion of said spherical body is received in said semi-cylindrical recess portion of said engaging member, allowing radial inward movement of said engaging member and disengagement of the pawl portion of said engaging member from said engaging section of said outer sleeve, and when said spherical body is axially advanced with said cylindrical movable member, said spherical body moves out of the semi-cylindrical recess portion and said engaging member is pushed radially outward to engage said engaging section of said outer sleeve.

4,503,737

THREADED FASTENER REMOVING TOOL

Donald DiGiovanni, 2769 Ware Rd., Rockford, Ill. 61111

Continuation of Ser. No. 483,542, Apr. 11, 1983, abandoned. This application Jul. 26, 1984, Ser. No. 634,661
Int. Cl.³ B25B *15/00*
U.S. Cl. 81—436 **4 Claims**



1. In combination, a threaded fastener engaged in a threaded opening in a part, said fastener having a head with a tool-receiving recess therein, said recess having a hexagonal cross-section defined by three pairs of opposite, generally parallel walls extending from an upper edge inwardly to a recess bottom portion, and a tool for removing said threaded fastener from said threaded opening when the recess in the fastener head is damaged or mutilated, said tool comprising:

a generally elongated tool body having opposite ends;

a hexagonally shaped end portion tapering toward and terminating at said one end and receivable within said recess;

said hexagonally shaped end portion having three pairs of opposite, converging sides;

the opposite sides in each pair tapering inwardly at an angle between about 2 to 4 degrees with respect to the axis of said tool body;

means on said sides of the hexagonally shaped end portion, remote from said one end, for wedgedly engaging the upper edge of the recess when said one end is within the recess; and,

the spacing of opposite sides of said hexagonally shaped end portion includes a gauge width that is substantially equal to the distance between the upper edge of the wall of a standard size recess in said fastener, and the axial location of said gauge width of said end portion is such that said one end of said tool body is positively spaced from the bottom of said recess when said gauge width is in substantial alignment with the upper edges of the walls of said recess.

4,503,738

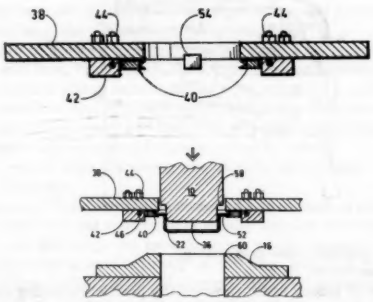
CAN FLANGE TRIMMING

Richard P. Morgan, R.D. 2, Box 115, Union, Me. 04862

Filed Feb. 25, 1983, Ser. No. 469,906

Int. Cl.³ B26D *7/18*

U.S. Cl. 83—146 **7 Claims**



1. In a machine for trimming flanges from the edges of preformed open mouth cans wherein the cans are fed in succession to a trimming station where a reciprocating punch propels them successively through a die, the punch coacting with the die to shear off the flanges to predetermined dimensions, the improvement facilitating release of each can for trimming on the forward stroke of the punch and stripping from the punch of the trim on its return stroke, comprising

a pair of opposed, hinged, grooved, flange-holding jaw members mounted with their grooves facing each other in a transverse plane between the retracted punch and the die, the grooved jaws being adapted initially to receive and hold the cans by their untrimmed flanges,

to swing simultaneously toward said die by motion of said can as it is propelled toward said die during the forward stroke of said punch releasing the can for trimming without lateral retraction of jaw members, and

to return to their original positions in said plane after releasing the cans, whereby during the return stroke of said punch they serve to strip the trim from the latter.

4,503,739

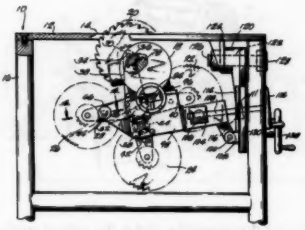
TABLE SAW WITH MULTIPLE BLADE TURRET

Edmund T. Konieczka, 520 Grove Ave., Wisconsin Rapids, Wis. 54494

Continuation of Ser. No. 341,934, Jan. 22, 1982,. This application May 25, 1984, Ser. No. 614,399

Int. Cl.³ B23D *19/04;* **B26D** *1/18;* **B27C** *9/04*

U.S. Cl. 83—471.1 **8 Claims**



1. A rotary table saw having mountings for plural saw wheels, a single saw wheel drive, and means to choose a particular saw wheel, comprising:

A. a work support table having a slot therein;

B. a frame for supporting said work support table;

C. a turret carried on a pivot supported by said frame and disposed for rotation in a substantially vertical plane, whereby to present a selected saw wheel at said table slot by rotating said turret;

D. plural saw wheel arbor gears disposed circumferentially around said turret for being driven to rotate a corresponding saw wheel; and

E. drive means having a first position for driving the arbor gears of the saw wheel presented at said table slot during operation of said saw and a second position for disengaging said arbor gears during rotation of said turret for selection of another saw wheel, said drive means comprising:

i. a drive gear;

ii. a motor having an output shaft for driving said drive gear; and

iii. means to displace said motor and drive gear as a unit between said first position in which said drive gear meshes with the arbor gear of the saw wheel presented through said slot and said second position in which said drive gear is disengaged from said arbor gear, whereby only the saw wheel in use is driven during operation of the saw, and only one drive means is required for driving the selected saw wheel.

4,503,740

OPTICAL CUTTING EDGE LOCATOR FOR A CUTTING APPARATUS

Robert D. Brand, Lawrence, and Ralph D. Runyan, Indianapolis, both of Ind., assignors to Capital Machine Company, Inc., Indianapolis, Ind.

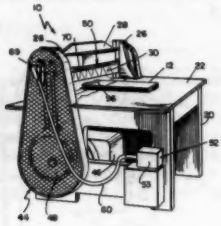
Filed Jan. 18, 1982, Ser. No. 340,506

Int. Cl.³ B26D *7/00, 5/20, 7/27*

U.S. Cl. 83—521 **15 Claims**

1. In a cutting apparatus including a working surface for supporting material to be cut, a movable carriage above the working surface, a knife connected to the carriage, the knife having a downwardly extending planar surface providing a cutting edge in substantially the same plane as the planar surface for cutting through the material in response to movement of the carriage, and optical means for locating the material relative to the cutting edge, the improvement wherein the optical means comprises a light source, at least one light transmission line coupled to the light source, the transmission line including a light-emitting distal end for producing a beam of

light, mounting means for mounting the light-emitting end of the transmission line to the carriage above the knife whereby the planar surface of the knife bisects the light-emitting end of the transmission line, and means for blocking substantially one half of the beam of light, the other one half of the beam of light



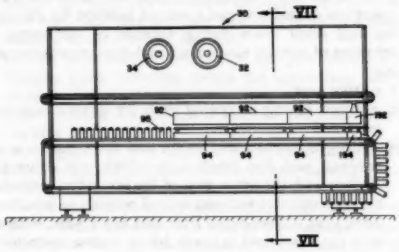
being projected downwardly along the planar surface toward the material, thereby causing the cutting edge to cast a shadow and define a single line between a shadow area and a light area on the material in substantially the same plane as the cutting edge.

4,503,741

BRIDGE TYPE PUNCH PRESS

James R. Hunter, Chadds Ford, and S. James Lazzarotti, Broomall, both of Pa., assignors to The Warner & Swasey Company, Cleveland, Ohio

Filed Jul. 26, 1982, Ser. No. 401,444
Int. Cl.[3] B26D *5/08;* B21J *7/46*
U.S. Cl. 83—549 **27 Claims**



1. A punch press (20) having a frame which spans a punching area, a punch head (32) supported on said frame (30) above the punch area, a two axis worksheet positioning mechanism (50) for positioning a sheet metal workpiece at desired locations in the punching area, characterized by:

an elongated punch support formed from removable punch cartridges (92) joined together and positionable as a unit to bring a selected punch beneath the punch head, with each punch cartridge (92) supporting a plurality of punches; and,

an elongated die support formed from removable die cartridges (94), corresponding to said punch cartridges (92), joined together and positionable as a unit simultaneous with positioning of said elongated punch support to position an appropriate die to receive the selected punch, with each die cartridge (94) supporting a plurality of dies.

4. A punch press (20) as claimed in claim 1 characterized by:

a disappearing table which is engaged and positioned by the last removable die cartridge (94) forming said elongated die support.

7. A punch press for acting on a worksheet comprising:

a main frame defining an elongated opening extending therethrough and being supported from only two areas;

a table frame securely attached to the front of the main frame and having only a single area support spaced apart from the connection to said main frame to define in conjunction with said main frame only a three-area support system;

a punch head mechanism supported from said main frame including a ram which can be reciprocated;

a work table supported on said table frame for supporting the portion of the worksheet in front of said main frame;

X-Y axes sheet positioning means disposed for two-axis positioning of the worksheet on said work table;

a plurality of punches positionable with respect to said main frame;

punch support means for supporting said plurality of punches from said main frame;

a plurality of dies associated with said plurality of punches positionable with respect to said main frame;

die support means for supporting said pulanty of dies from said main frame; and,

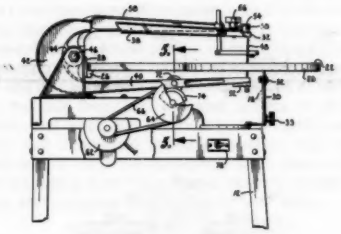
connecting means for connecting the ram of said punch head to a selected punch which in cooperation with the associated die acts on the worksheet when the punch head ram reciprocates.

4,503,742

PRECISION SAW

Bill E. Sutton, 1802 Boswell, Branson, Mo. 65616

Filed Dec. 3, 1982, Ser. No. 446,727
Int. Cl.[3] B23D *49/00*
U.S. Cl. 83—781 **2 Claims**



1. A precision saw comprising:

a framework;

a pair of spaced apart, substantially parallel mounting plates rigidly connected with said framework and extending therefrom;

a C-member having generally parallel upper and lower arms and a curved bight connecting said upper and lower arms, said arms and bight being integral;

an ear integral with said bight and projecting from the concave side thereof, said ear fitting closely between said mounting plates;

a substantially horizontal pivot pin extending through said ear and mounting plates to mount said C-member for pivotal movement about a horizontal pivot axis defined by said pivot pin;

a saw blade extending between said upper and lower arms for cutting a work piece;

power means for driving said C-member in reciprocating motion about said pivot pin to effect movement of the saw blade;

a table presenting a planar work surface for feeding of the workpiece to the saw blade, said work surface having an opening for receiving the saw blade;

a cross brace rigidly connected with said mounting plates and extending therebetween;

means for connecting one end of said table to said cross brace for pivotal movement about a first pivot point;

a bracket rigidly connected with said framework and extending therefrom, said bracket being spaced from said cross brace; and

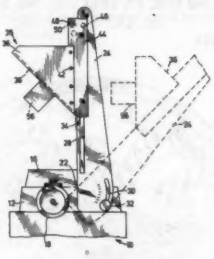
means for connecting said table to said bracket for pivotal movement about a second pivot point aligned with said first pivot point to establish a pivot axis about which said table can be tilted.

4,503,743

BAND SAW WITH TILT AND SLIDE FRAME AND QUICK RELEASE VISE

Chester Ryba, 3152 50th St., Bangor, Mich. 49013

Filed Apr. 4, 1983, Ser. No. 466,056
Int. Cl.³ B27B *13/04*
U.S. Cl. 83—801 **14 Claims**



1. In a sawing machine having a work supporting base, work holding jaws adjustable relative to each other along the surface of said base and angularly adjustable about parallel axes normal to said base, the combination comprising:

a pair of arms swingable connected along a common axis to said base, one at each end of the base, and swingable in parallel planes normal to the work supporting surface of said base, said arm each having a slideway thereon extending longitudinally of each arm and in parallel relation,

means connecting said arms to swing in unison,

a pair of slide members, one slidable along each of said slideways,

a pair of frame members connected one to each of said slide members and projecting in parallel relation laterally from said slideways and each having a wheel support element projecting longitudinally of the base and in a common plane inclined about 45 degrees from said slideways,

a pair of saw pulley wheels mounted on said wheel support elements and rotatable in a plane parallel to the plane of the elements,

a motor connected to drive one of said wheels and a band saw trained around the wheels,

and power means anchored to one of said arms and swingable therewith, said power means being connected to the slide member on said one arm to move the slide member along the arm.

4,503,744

CLEAVING DEVICE FOR OPTICAL FIBERS

Peter Garner, Flemington; Nicholas T. Stancati, Mountainside, and Tadeusz Szostak, Jackson, all of N.J., assignors to Thomas & Betts Corporation, Raritan, N.J.

Continuation-in-part of Ser. No. 360,206, Mar. 22, 1982, abandoned. This application Jul. 2, 1982, Ser. No. 394,526
Int. Cl.³ C03B *37/16*
U.S. Cl. 83—879 **13 Claims**

1. An optical element cleaving apparatus comprising:

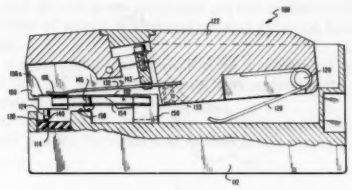
a housing;

an optical element support member on said housing;

a movable member in said housing for movement relative to said optical element support member under the influence of a first force;

a scoring element supported in said housing for movement relative to said movable member, said scoring element being disposed adjacent said optical element support; and

a cantilevered spring member movably attached to said movable member and directly supporting thereon said scoring element, said mounting member being cooperating with said scoring element for movement relative to said movable member for applying a predetermined regulatable force by said scoring element to an optical fiber on said support member different from said first force, said cantilevered spring member being deflectable and further including adjustment means coupled thereto for varying said predetermined regulatable force by regulating the amount of deflection of said cantilevered spring member.

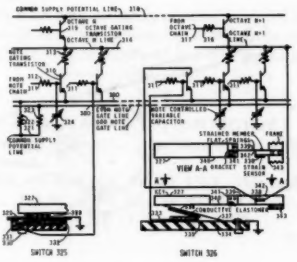


4,503,745

MUSICAL INSTRUMENT

Melville Clark, Jr., 8 Richard Rd., Cochituate, Mass. 01778, and David A. Luce, Clarence Center, N.Y., assignors to Melville Clark, Jr., Wayland, Mass.

Continuation of Ser. No. 695,042, Jun. 11, 1976, Pat. No. 4,365,533, which is a continuation-in-part of Ser. No. 495,130, Aug. 5, 1974, abandoned. This application Aug. 2, 1982, Ser. No. 404,134
Int. Cl.³ G10H *1/34*
U.S. Cl. 84—1.1 **10 Claims**



1. In an electronic musical instrument having a keyboard with a plurality of keys, a tone signal generator for producing a tone signal, means for controlling said tone signal generator in response to operation of one of said keys and an output system for receiving said tone signal and converting the same into sound waves, the combination comprising:

(a) sensing means juxtaposed with said keyboard for sensing the force applied to said one of said keys independently of key speed at which operated and for producing a DC electrical signal having a level corresponding to the instantaneous value of said force, and

(b) amplifier means connected to said sensing means and to said output system for controlling the amplitude of said sound waves in response to said DC electrical signal.

4,503,746

SOUND EFFECT CONTROL DEVICE FOR AN ELECTRIC GUITAR

Ikutaro Kakehashi, Shizuoka, Japan, assignor to Roland Corporation, Osaka, Japan

Filed Aug. 5, 1983, Ser. No. 520,635
Claims priority, application Japan, Jan. 31, 1983, 58-13373[U]
Int. Cl.³ G10D *3/00;* **G10G** *5/00;* **G10H** *1/02, 3/18*
U.S. Cl. 84—1.16 **5 Claims**

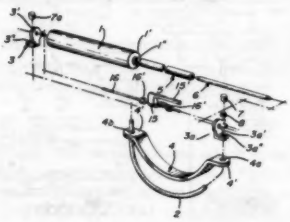
1. A device for controlling the sound effect of an electric guitar having a guitar body, said device being disposed in said guitar body, comprising sound effect control circuit means, shoulder band pin means operatively supported on said guitar body, a shoulder band operatively secured to said shoulder band pin means, one of said shoulder band pin means being capable of moving in response to a force applied thereto through said shoulder band, and a mechanical-electrical converting means responsive to the movement of said one shoulder band pin means for converting the force applied to said one shoulder band pin means into an electric signal which is supplied to said sound effect control circuit means for controlling the output sound of said electric guiter by pulling said shoulder band.

4,503,747

CAPO

Clément Labbé , 1401 De Lanaudière St., Apt. 6, Joliette, Quebec, Canada J6E 3N9

Filed Dec. 5, 1983, Ser. No. 557,914
Int. Cl.³ G10D *3/04*
U.S. Cl. 84—318 **7 Claims**



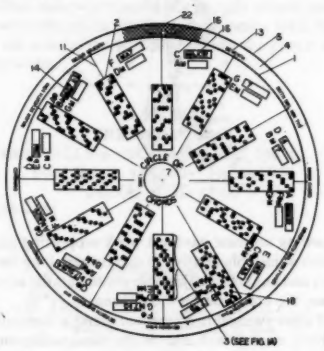
1. A capo for a stringed instrument having an elongated neck and fingerboard, comprising: a pressure member adapted to be mounted transversely of said neck and capable of rolling displacement about its longitudinal axis; said pressure member being in the form of a cylindrical roller formed with a central through bore, having a sleeve extending through said through bore and fixed thereto, and having a rod extending through said sleeve, whereby said roller can rotate about said rod; a pair of transversely-spaced mounting elements located at either end of said pressure member and supporting the same; each said mounting element having an upper portion transverse to said rod, and a lower outwardly-projecting portion generally normal to said upper portion; said mounting elements thereby having an L-shape profile; said rod having its outer ends fixed in holes made therefor in said upper portion of said mounting elements; a neck attachment member adapted to transversely, closely fit the undersurface of said neck and lying in the same transverse plane as said pressure member, a releasable position-locking means; an elastic tensioning member extending around the exterior surface of said attachment member; the latter being formed with first tensioning member retaining means at both its ends; said pair of mounting elements being provided with a second tensioning member retaining means, whereby said attachment member is slidable with the rolling movement of said pressure member and said tensioning member positively urges the pressure member into even contact with the strings of said instrument and against said fingerboard.

4,503,748

CHORD DISPLAY DEVICE FOR FRETTED STRING INSTRUMENT

Edmund A. Barber, Jr., 42 Fairview Square, Ithaca, N.Y. 14850

Filed Oct. 17, 1983, Ser. No. 542,454
Int. Cl.³ G09B *15/02*
U.S. Cl. 84—474 **14 Claims**



1. A device to display musical chords for fretted string instruments comprising: (a) a sheet member having transparent portions upon which a plurality of patterns representing the strings and frets of a fingerboard are inscribed, said fingerboard patterns being disposed angularly about a central point on said sheet member and displaced incrementally according to the spacing between frets, each fingerboard pattern being identified by a certain root note in a musical chord; (b) a pivot member located at said central point on the sheet; (c) rotatable disk means imprinted with a plurality of patterns of spots, each pattern of spots corresponding to a certain type of chord, whereby the disk may be rotated about the pivot to align a particular pattern of spots on the disk with a particular fingerboard pattern on the above-mentioned sheet, displaying the finger positions and open strings that may be sounded to play a certain musical chord.

4,503,749

COMBINE VISOR WITH ENVIRONMENTAL COMPONENTS

Lowell L. Kuhn, Independence, Mo., and Stephen G. Miggels, Wyckoff, N.J., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Mar. 28, 1984, Ser. No. 594,285
Int. Cl.³ B60H *1/26*
U.S. Cl. 98—2.11 **9 Claims**

1. A visor and roof structure for a combine cab having upwardly extending front, rear and side walls with a door mounted in one of the side walls, said visor and roof structure comprising:

a horizontally disposed headliner secured to said front, rear and side walls, said headliner extending across the top of said cab to form a roof for the latter and including visor

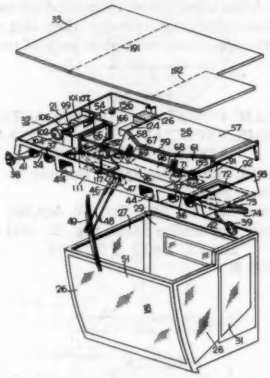
portions extending horizontally outward from said front and side walls except from the part of said one side wall in which said door is mounted, said headliner having a bottom presenting a first opening defining an air inlet in said visor portion extending outwardly from said one side wall and a second opening above said cab defining an air outlet from said cab,

a removable flat top releasably secured to said headliner,

an air filter in said air inlet, said air filter being downwardly removable from said inlet,

an air conditioning unit mounted in said visor portion of said headliner extending outwardly from the other of said side walls, said air conditioning unit having at least one intake opening and at least one output opening,

walls rigidly secured to and extending upwardly from said bottom of said headliner to said top defining an air inlet passageway extending between said air inlet and said air intake opening of said air conditioning unit, said air inlet passageway including the portion of said bottom in which said air outlet is presented,



a damper pivotally mounted on said headliner in said air inlet passageway for progressive movement between a closed position in which said damper substantially prevents air from passing from said cab to said air inlet passageway by way of said air outlet and an open position in which air is permitted to flow from said cab through said air outlet to said air conditioning unit and in which said damper restricts air flow to said air conditioning unit from said air inlet,

wall means in said headliner defining a conditioned air passageway connected to said air output opening of said air conditioner unit, a part of said conditioned air passageway being disposed at the rear of said air inlet passageway in the portion of said headliner disposed above the front of said cab, and

conditioned air delivery vents in said conditioned air passageway of said headliner for delivering conditioned air into said cab.

4,503,750

AMMUNITION MAGAZINE

James F. Ignacek, Placentia, Calif., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 10, 1983, Ser. No. 456,940
Int. Cl.³ F41D *10/26*
U.S. Cl. 89—34 **6 Claims**

1. A curved magazine for storing and delivering linkless rounds of ammunition comprising:

a curved housing having a curved inboard wall, a curved outboard wall, and a floor,

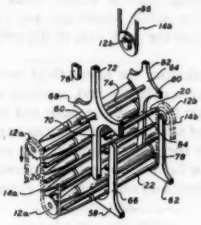
a plurality of first guides, one of said first guides mounted on said floor adjacent said curved outboard wall, another of said first guides mounted adjacent said curved outboard wall and on a bracket support between said curved inboard wall and said curved outboard wall,

a plurality of rotatable gears, in pairs, one gear of which is operatively mounted on one of said first guides and the other one of which is operatively mounted on said curved inboard wall,

a pair of endless flexible chain carriers, one of which is disposed on said gears along said curved inboard wall and the other of which is disposed on said gears on said first guides,

said endless chain carriers following a serpentine path, a portion of which progresses circumferentially with repeating transverse excursions,

a plurality of pusher rods each of which is mounted in spaced relation between said endless chain carriers,



said pusher rods aligned radially relative to said curved inboard and outboard walls,

a plurality of rounds of ammunition each of which is disposed between adjacent ones of said pusher rods,

said pusher rods imparting movement to said rounds,

a plurality of central guides mounted between said curved walls and positioned adjacent the center of gravity of said rounds, said central guides preventing movement of said rounds transverse said endless chain carriers,

a hand-off sprocket mounted adjacent said endless chain carrier to remove each of said rounds from said endless chain carrier,

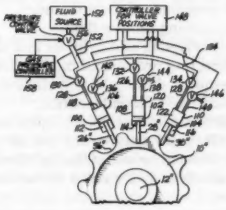
an upwardly extending elevating conduit mounted adjacent said hand-off sprocket having buckets for the operative receipt of said rounds from said hand-off sprocket.

4,503,751

DIGITAL FLUID STEPPING MOTOR

George T. Pinson, Huntsville, Ala., assignor to The Boeing Company, Seattle, Wash.

Division of Ser. No. 397,605, Jul. 12, 1982,. This application Jun. 11, 1984, Ser. No. 619,570
Int. Cl.³ F15B *21/02;* F01B *1/06*
U.S. Cl. 91—36 **21 Claims**



1. A digital command stepping motor comprising:

a cam mounted for rotation about an axis, said cam having a circular peripheral portion presenting a radially out-

wardly directed, smoothly undulating cam surface, defined by alternating peak and valley regions;

a set of three linear actuators disposed radially outwardly from said cam surface, each said actuator comprising a radially extending push rod having an end portion in contact with said cam surface, means for forcibly driving its push rod endwise against said cam surface, and means for removing the drive force from its push rod; and

said actuators being spaced relative to said cam surface such that when the push rod of any one actuator is fully extended and in contact with the bottom of a valley region, the push rod of the second actuator is in a partially extended position against a sloping surface between a peak and a valley, and the push rod of the third actuator is in a partially extended position against an oppositely sloping surface between a peak and a valley, so that the cam wheel can be rotated in position in either direction, by operating the actuators to drive the push rod which is in contact with the sloping surface which trails the direction of desired rotation while removing any radially inwardly directed force on the push rods of the other two actuators; and

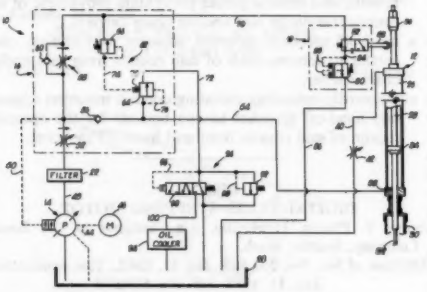
wherein said actuators are linear fluid motors having wall means defining a cylinder and, a piston slidably received in said cylinder to which the push rod is connected, said wall means and said piston defining an expansible chamber on the side of the piston opposite the push rod and said stepping motor further comprising means for delivering a driving fluid into and out from said expansible chamber.

4,503,752

HYDRAULIC PUMPING UNIT

Samson A. Olson, Olathe, and George C. Williams, Prairie Village, both of Kans., assignors to Hypex, Incorporated, Olathe, Kans.

Filed Mar. 29, 1983, Ser. No. 480,075
Int. Cl.³ F15B *13/02*; F01L *15/02*
U.S. Cl. 91—48 **1 Claim**



1. A hydraulic pumping unit including:

a pump cylinder having an element shiftable between first and second positions received therein;

means for pressurizing motive fluid;

means operably coupling said cylinder and said pressurizing means for directing pressurized motive fluid to said cylinder for subsequent shifting of said element from said first position toward said second position;

first flow control means operably coupled to said directing means for selectively varying the rate at which said motive fluid is directed to said cylinder, thereby controlling the rate at which said element is shifted toward said second position;

means operably coupled to said cylinder for exhausting motive fluid from said cylinder, for subsequent shifting of said element from said second position toward said first position;

second flow control means operably coupled to said exhausting means for selectively varying the rate at which said fluid is exhausted from said cylinder, thereby controlling the rate at which said element is shifted toward said first position, said second flow control means comprising a non-adjustable sequence valve and pressure sensing relief valve operably coupled to said sequence valve for actuation of said sequence valve;

said first and second control means being variable independent from each other such that the rates at which said element shifts toward said first and second positions are individually controllable; and

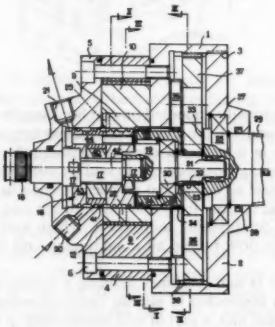
a reset valve normally open as the element is shifted toward said second position and a kick down valve in communication with said reset valve and shiftable from a closed to an open position upon there being a predetermined pressure on said motive fluid as the element is moved from said first position to said second position, the kick down valve remaining open until there is no further flow therethrough, the kick down valve being operably connected to said second flow control means, whereby opening of said kick down valve causes controlled exhaustion of said motive fluid from said cylinder after said element has reached the uppermost limit of its path of travel.

4,503,753

HYDRAULIC POWER-ASSISTANCE ACTUATING MECHANISMS, ESPECIALLY FOR SERVO-ASSISTED STEERING SYSTEMS

Juan S. Bacardit, Barcelona, Spain, assignor to Bendiberica S.A., Barcelona, Spain

Filed Sep. 17, 1982, Ser. No. 419,266
Claims priority, application Spain, Sep. 23, 1981, 506438
Int. Cl.³ B62D *5/10, 5/06*
U.S. Cl. 91—375 R **9 Claims**



1. A hydraulic power-assistance actuating mechanism comprising: a casing housing a force step-up transmission having a rotary output member intended to be connected to a driven system to be actuated and a rotary input member intended to be connected to a driven system, a hydraulic distributor having a rotor member coupled for rotation with said input member and a stator member coupled for rotation with said output member, said rotor member and stator member being capable of a limited relative rotational displacement to selectively actuate at least one double-acting assistance hydraulic motor coupled to said output member, characterized in that said input and output members of the mechanism are coaxially aligned, and the force step-up transmission comprises a coaxial epicyclic gear train which includes a sun gear coupled for rotation with the stator member of the distributor and at least one planet gear carried by a transverse arm coupled to said output member, the double-acting assistance hydraulic motor comprising a bladed rotor coaxial with the input and output members and having radially extending blades, the bladed rotor

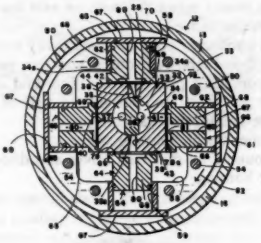
coupled for rotation with said output member and sealingly and slidingly rotating in a cavity formed in the casing of said mechanism.

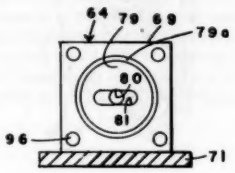
4,503,754

ROTARY CYLINDER ENGINES WITH PISTONS HAVING BALANCED LOADS

Everett F. Irwin, 430 Orangewood Dr., Dunedin, Fla. 33528

Filed Jun. 1, 1984, Ser. No. 616,237
Int. Cl.³ F01B *13/06*
U.S. Cl. 91—488 **13 Claims**





1. A rotary cylinder engine, comprising, a non-rotatable housing,

a shaft rotatably mounted in said housing, and extending from and rotatable relative to said housing,

a cylinder block rotatably mounted in said housing,

said cylinder block having a central opening therein receiving said shaft with the axis of rotation of said shaft being eccentric with respect to the axis of rotation of said cylinder block,

a plurality of cylinders formed substantially radially in said cylinder block with the outer end of said cylinders being sealingly closed,

a piston slideably disposed in each of said cylinders with said piston having a fluid passageway extending therethrough from the inner end of said piston and open at the end thereof adjacent the sealed end of said cylinder,

cam means with a plurality of flat cam surfaces thereon, with one cam surface being disposed radially inwardly of each of said pistons and being slideably and sealingly engaged by the radially inner end of said piston it is radially inwardly of,

means connecting said cam means for unitary rotation with said shaft,

means holding the inner ends of said pistons sealingly against said cam surfaces,

means including said piston means and said cam means for rotating said cylinder block and said shaft unitarily,

a cam fluid passage means in each of said cam surfaces confluent with the fluid passageway in the piston engaging said cam surface,

a pair of fluid passage means extending into said housing with one being a fluid source and one being an exhaust means,

said source means and said exhaust means being alternately confluently connected to said cam fluid passage means in said cam surfaces,

said inner end of each of said pistons has a centrally formed depression formed therein substantially equal in area to the area of the outer end of said piston with said depression being formed confluent with the fluid passage on said piston,

the inner end of said piston includes a sealing member therein sealingly engaging the cam surface disposed radially inwardly of said piston,

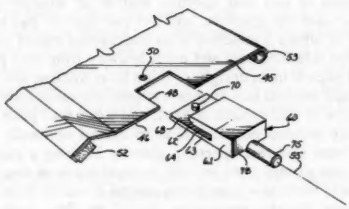
and said inner end of said piston includes friction reducing means disposed outwardly of said sealing member for reducing friction between said piston and said cam surface and for preventing excess loads on said sealing member.

4,503,755

LOUVER SYSTEM

Dennis D. Nordquist, Phoenix, and Derron G. Vandewege, Mesa, both of Ariz., assignors to Idea Development Engineers of Arizona, Inc., Tempe, Ariz.

Filed Sep. 15, 1982, Ser. No. 418,310
Int. Cl.³ F24F *13/10;* **F16K** *1/20*
U.S. Cl. 98—110 **4 Claims**



1. In a louver system having an air conduit the flow through which is to be regulated by the positioning of a movable louver, the improvement comprising:

a. a louver extending across said conduit;

b. means defining a notch in an edge of said louver, said edge and notch positioned adjacent to a wall of said conduit;

c. means defining a locking hole in said louver proximate said notch;

d. a one piece molded plastic hinge pin assembly having a cylindrical pin extending therefrom for insertion into an opening provided therefor in said wall;

e. said hinge pin assembly having a slot therein to accommodate the insertion of an edge of said louver and having an outer form conforming to said notch to permit said assembly to be inserted in said notch, said assembly when positioned in said notch having only said cylindrical pin extending away from said louver beyond said edge; and

f. said one piece assembly also including a locking pin formed integrally therewith extending perpendicular to the plane of said slot and positioned to intrude into the plane of said slot to permit said pin to extend into said locking hole when said louver is inserted in said slot.

4,503,756

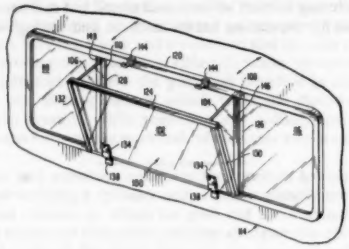
ATTACHMENT FOR MOTOR VEHICLES WITH REAR WINDOWS

Richard Chatlos, Johnstown, Pa., assignor to Air-O-Scoop Corporation, Johnstown, Pa.

Continuation-in-part of Ser. No. 377,564, May 12, 1982, Pat. No. 4,393,753, Continuation of Ser. No. 194,224, Oct. 6, 1980, Pat. No. 4,346,648, Continuation-in-part of Ser. No. 118,444, Feb. 4, 1980, Pat. No. 4,326,451. This application Jul. 15, 1983, Ser. No. 514,198

Int. Cl.³ B60J *1/20*

U.S. Cl. 98—2.12 **7 Claims**



1. An air flow device for a closed motor vehicle or boat for positioning in the rear aperture thereof which comprises (i) a plate that is transparent in at least the central region thereof, (ii) means for attaching said air flow device to said rear aperture, said attachment means including pivot means which is pivotally attached between the bottom portion to said plate and to the lower rim of said aperture, (iii) two vertical side members, each of which is attached to an end of said plate so as to extend outwardly from said plate, each of said vertical side members being in sliding relationship with one of the vertical sides of said rear aperture and/or of window glass mounted in said rear aperture, and (iv) two narrow end members, each of which is attached to an unoccupied end of one of said vertical side members and extends away from said plate, when said plate is in an upright position so as to close said rear aperture, said vertical side members extend outwards from said rear aperture of said vehicle or boat, and when said plate is in an inwardly pivoted position so as to extend upwardly and inwardly from said rear aperture, thereby forming a gap between the top of said plate and the vertical plane of said rear aperture, said vertical side members extend inwardly from said rear aperture thereby preventing lateral air flow into said vehicle or boat, said end members preventing the inwards pivoting of said device beyond the outer edges of said side members.

4,503,757

BEVERAGE BREWING APPARATUS

Donald L. Daugherty, Sherman, Ill., assignor to Bunn-O-Matic Corporation, Springfield, Ill.

Filed Jan. 16, 1984, Ser. No. 570,817

Int. Cl.³ A47J *31/00*

U.S. Cl. 99—281 **4 Claims**

1. In apparatus for brewing coffee or tea and having:

a body which includes, a base which incorporates a beverage beaker warmer, an upstanding hot water tank housing mounted on said base, and an upper housing mounted on said upstanding housing and a portion of which overhangs said warmer and a beaker when placed thereon and having a removable housing cover;

brewing funnel support means exteriorly mounted on the underside of said overhanging portion of said upper housing;

a hot water tank having a removable cover and housed for the most part within said upstanding hot water tank housing and suspended therein from within said upper housing;

a cold water inlet tube mounted on said hot water tank cover and projecting downwardly into said hot water tank;

an electrically energized immersible heating element mounted on said hot water tank cover and projecting downwardly into said hot water tank;

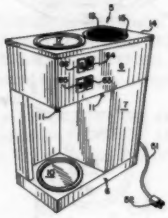
a hot water discharge tube disposed within said upper housing and mounted in cantilever fashion on said hot water tank with its proximal and hot water inlet end communicating with the upper portion of said tank and with its distal and hot water discharge end protruding from the underside of said overhanging portion of said upper housing;

a sprayhead mounted on said protruding discharge end of said hot water discharge tube for spraying hot water into a brewing funnel when disposed on said brewing funnel support means; and

an electrical connector cord for electrically energizing said apparatus from a power source and one end of which carries a connector plug and the other end of which extends into said body and provides a pair of electrically energizable conductors therein;

the improvement, which comprises:

a bracket mounted on said tank cover and disposed within said upper housing;



a terminal block mounted on said bracket and having thereon a first pair of electrically interconnected terminals and a second pair of electrically interconnected terminals;

a regulatable thermostat mounted on said bracket;

water temperature sensing means extending between the interior of said hot water tank and said thermostat and passing through an opening in said tank cover;

first conductors electrically interconnecting one of said pair of electrically energizable conductors in series with said first pair of terminals and one terminal of said water heating element; and

second conductors electrically interconnecting the remaining one of said pair of electrically energizable conductors in series with said second pair of terminals, said thermostat, and the remaining terminal of said water heating element;

removal of said housing cover, detaching said tank cover from said upper housing, removal of said sprayhead and freeing said distal end of said hot water discharge tube from said upper housing, and disconnecting said connector means allowing said hot water tank and said bracket and thermostat mounted thereon to be removed as a unit from said body.

4,503,758

TOASTER

James G. Carville, Spring Lake, N.J., assignor to Alco Foodservice Equipment Company, Miami, Fla.

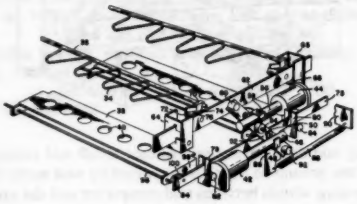
Filed Jul. 22, 1982, Ser. No. 400,940

Int. Cl.³ A47J *37/08*

U.S. Cl. 99—329 RT **3 Claims**

1. A toaster comprising a toasting compartment having upper and lower ends and an elongated cross-section transverse to the direction between the upper and lower ends, an opening for the insertion of a slice of bread, the slice of bread

having parallel faces extending from one edge of the slice to an opposite edge thereof, guide means for engaging the faces of the bread slice and thereby maintaining the slice of bread in a position such that said one edge of the slice of bread is at a higher level than the opposite edge while in the toasting compartment, and a discharge opening at the lower end of the compartment, releasable bread support means within the toasting compartment for engaging said opposite edge of the slice of bread within the toasting compartment and temporarily maintaining the slice of bread in the toasting compartment with said



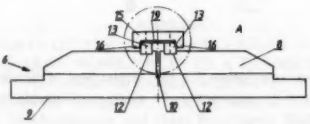
opposite edge spaced above the discharge opening, means for establishing a toasting cycle and means responsive to the toasting cycle-establishing means for releasing the bread support means at the end of the toasting cycle, thereby causing the slice of bread to drop through the discharge opening, and means for effecting a movement of the bread support means immediately before the release thereof so that it pushes against said opposite edge of the bread slice in a direction substantially parallel to the faces of the bread slice, whereby if the bread slice is adhered to the guide means it is forcibly dislodged.

4,503,759

BAKING PLATE

Franz Haas, Sr., Gerstlgasse 25, A-1210 Wien; Franz Haas, Jr., Kreuzgasse, A-2100 Leobendorf, and Johann Haas, Seitenweg 4, A-3400 Klosterneuburg, all of Austria

Filed Aug. 25, 1982, Ser. No. 411,556
Claims priority, application Austria, Sep. 10, 1981, 3921/81
Int. Cl.³ A47J *37/00*
U.S. Cl. 99—380 **74 Claims**



1. In a baking plate for cooperating with a second baking plate to define a cavity for receiving dough to be baked, which baking plate has on one side a generally flat dough-treating surface and on the opposite side a rear surface,

the improvement residing in that

said rear surface of said baking plate is formed with at least one channel,

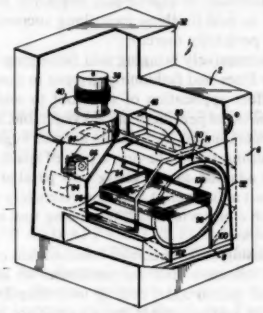
at least one adjustable stressing device is connected to said rear surface of said baking plate on opposite sides of said at least one channel and operable to subject said baking plate to an adjustable initial bending stress in such a manner that said channel is contracted to an adjustable extent transversely to the longitudinal direction of said channel and that an adjustable convex camber is imparted to said dough-treating surface.

4,503,760

FORCED CONVECTION OVEN

Gunter G. Pryputsch, South Delta; Lennox M. Leila, Richmond; Gerald E. Parkinson, Vancouver, and Leonard A. Arneson, Port Coquitlam, all of Canada, assignors to Omega Air Flow-21, Ltd., S. Delta, Canada

Filed Oct. 5, 1981, Ser. No. 308,158
Int. Cl.³ A47J *27/026*
U.S. Cl. 99—447 **30 Claims**



1. A device for cooking or heating food, comprising:

(a) a housing with an inside;

(b) a stationary support inside said housing with a position for supporting food;

(c) means for supplying a stream of hot air to said inside;

(d) hollow drum means rotatably mounted to said housing in said inside and said stationary support projecting into an open end of said drum means and said drum means being rotatable about said stationary support and said drum means including a side wall; and,

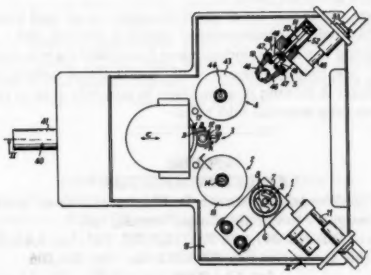
(e) opening means disposed in said sidewall over a preselected area thereof and substantially the remaining area of said sidewall being solid whereby rotation of said drum means causes corresponding rotation of said opening means and thereby generally radially directs hot air to the position of the food for uniformly heating the food.

4,503,761

MACHINE FOR FASHIONING VEGETABLES AND SIMILAR PRODUCTS

Jean-Francois Cailloux, 12, allée de Montfermeil, 93340 Le Raincy, France

Filed Feb. 18, 1982, Ser. No. 467,804
Claims priority, application France, Feb. 23, 1982, 82-02928
Int. Cl.³ A23N *7/00*; A23P *1/00*
U.S. Cl. 99—486 **15 Claims**



1. A machine for fashioning vegetables or similar articles comprising:

a fashioning gripper comprising a pair of opposed jaws adapted to grip a vegetable therebetween, said jaws being movable in opposed directions along a common axis extending through said vegetable;

a fashioning tool arranged adjacent said fashioning gripper and mounted to rotate about an axis parallel to said common axis;

indexing means for rotating said fashioning gripper about said common axis through a plurality of predetermined angular distances to expose said vegetable held between said jaws to said finishing tool along successive parts of the outer periphery thereof;

means for successively bringing said fashioning tool toward and away from said fashioning gripper in timed cooperation to effect application of said tool to said successive parts of the outer periphery of said vegetable, said fashioning tool operating to form facets on said vegetable;

an output cutting station having a pair of spaced apart cutting tools adapted to cut along two parallel planes and spaced apart a distance at least approximately equal to the axial length along which said fashioning tool engages said vegetables; and

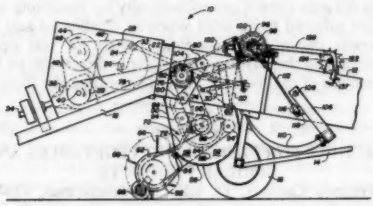
means for passing said vegetables between said cutting tools with said common axis perpendicular to said parallel planes, said spaced apart cutting tools thereby operating to cut from said vegetable parts extending beyond said facets so that said facets end axially at two planar end faces formed by said cutting tools on said vegetable.

4,503,762

KNOTTER TRIP MECHANISM

Adrianus Naaktgeboren, Veldegem, Belgium, assignor to Sperry Corporation, New Holland, Pa.

Filed Apr. 12, 1984, Ser. No. 599,370
Int. Cl.³ B65B *13/26*
U.S. Cl. 100—4 **11 Claims**



1. A baler comprising:

(a) a bale case;

(b) a plunger reciprocating in said bale case;

(c) a knotter mounted on said bale case for tying a strand of twine around a bale;

(d) first trip means for preventing operation of said knotter until a bale of predetermined length is formed; and

(e) second trip means, independent from said first trip means, for preventing operation of said knotter unless said plunger is moving in a direction in said bale case to compress crop material into bales.

4,503,763

VEHICLE COMPACTOR

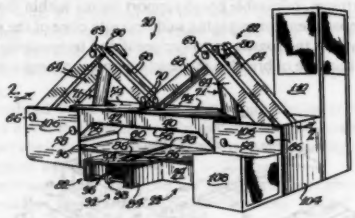
Richard E. Woods, and Marvin D. Bradburn, both of Markle, Ind., assignors to Car-Go, Corp., Muncie, Ind.

Division of Ser. No. 347,489, Feb. 10, 1982, Pat. No. 4,426,928. This application Sep. 22, 1983, Ser. No. 534,806
Int. Cl.³ B30B *9/32*
U.S. Cl. 100—35 **10 Claims**

1. A method for rendering portable a vehicle compactor having a frame and at least one door which opens and closes toward the frame for compacting vehicles against said frame, said method comprising:

opening said door;

placing a ground supported surface over said frame, said surface being engageable by said door;



closing said door against said surface to lift said compactor off the ground so as to be supported by said surface;

interposing wheels between said compactor and the ground; and

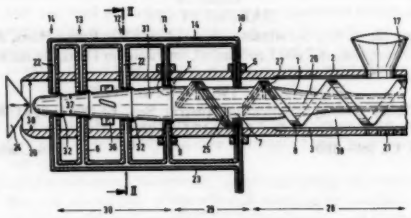
opening said door to remove said surface so as to lower said compactor upon said wheels.

4,503,764

PRESS INSTALLATION

Klaus Koch, Laatzen, and Gerhard Syrbius, Grossburgwedel, both of Fed. Rep. of Germany, assignors to Hermann Berstorff Maschinenbau GmbH, Hannover, Fed. Rep. of Germany

Filed Dec. 15, 1983, Ser. No. 561,930
Claims priority, application Fed. Rep. of Germany, Dec. 24, 1982, 3248059
Int. Cl.³ B30B *9/14*
U.S. Cl. 100—117 **5 Claims**



1. A press installation for the separation of liquid components from solid components of a mixture of liquids and solids, comprising:

a press cylinder;

a screw rotatably mounted in said press cylinder, said screw comprising a core and a helical screw thread arranged on said core at least a portion of the length thereof;

a plurality of pins penetrating radially through said press cylinder, said pins pointing toward the axis of said screw and extending to a position below said screw thread;

a plurality of breaks in said screw thread, said breaks corresponding in position with said pins such that, upon rotation of said screw, said pins pass through said breaks;

a plurality of axial drainage bore holes extending through said pins, respectively, and opening toward the axis of said screw;

a drainage pipe connected to said drainage bore holes;

a discharge zone in which said screw core is devoid of said screw thread, the construction of said core and said cylinder in said discharge zone being such that the free annular

cross sectional area between said core and said cylinder increases toward the discharge end of said press, and

a step-like annular offset formed on said core in said discharge zone in the vicinity of said pins, said offset having a bottom closely adjacent the radially inner ends of said pins, thereby forming therebetween a parting gap for the removal of the liquid released.

4,503,765

PRESS FOR THE REMOVAL OF MOISTURE FROM WET WEBS OF FIBER MATERIAL

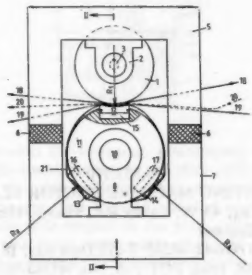
Christian Schiel, Heidenheim, Fed. Rep. of Germany, assignor to J. M. Voith GmbH, Heidenheim, Fed. Rep. of Germany

Filed Feb. 7, 1983, Ser. No. 464,646

Claims priority, application Fed. Rep. of Germany, Feb. 17, 1982, 3205664

Int. Cl.³ B30B *9/24, 9/20;* D21F *3/00*

U.S. Cl. 100—118 **6 Claims**



1. A press adapted for applying pressure to a moving web, comprising:

a pressure roll,

at least two pressure shoes respectively extending axially of said pressure roll only one of said pressure shoes at a time being closely spaced near said pressure roll to form a single pressure zone therewith,

means for selectively moving a respective one of said pressure shoes between an operative position forming said single pressure zone with said pressure roll and an inoperative position away from said pressure roll, and

a pressure belt adapted to engage said web which extends about said pressure shoes.

4,503,766

PARTS DEPOSITORY, PARTICULARLY FOR LARGE-AREA WORKPIECES IN A TRANSFER PRESS HANDLING LARGE WORKPIECES

Harald Hacker, Weingarten; Ulrich Amann, Baindt; Karl Geisinger, Meckenbeuren, and Hans Engelhardt, Baienfurt, all of Fed. Rep. of Germany, assignors to Maschinenfabrik Müller-Weingarten AG, Weingarten, Fed. Rep. of Germany

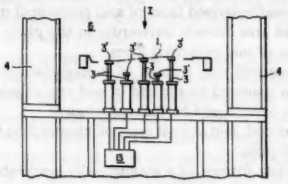
Filed Sep. 26, 1983, Ser. No. 536,035

Claims priority, application Fed. Rep. of Germany, Dec. 9, 1982, 3245603

Int. Cl.³ B30B *15/30*

U.S. Cl. 100—207 **3 Claims**

1. In a transfer press for a stepwise deformation of workpieces, including a plurality of stages arranged in a series, means for intermittently advancing the workpieces from one stage to a successive stage; some of said stages being working stages for deforming the workpieces; at least one of said stages being an empty stage void of workpiece-deforming means; support means arranged in said empty stage for supporting a workpiece while the workpiece dwells in said empty stage; the improvement wherein said support means comprises a plurality of supporting elements distributed over a zone intended to accommodate a workpiece; each said support element having a vertically oriented member including an upper terminus forming an engagement area for contacting the workpiece at locations spaced from one another; each vertically oriented member being vertically adjustable for setting the engagement areas arbitrarily to generally conform to topographical characteristics of the workpieces.



4,503,767

METHOD AND APPARATUS FOR SUSTAINING AN OSCILLATORY MOVEMENT

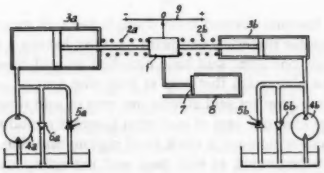
Jean Lucas; Jean-Francois Goupillon, and Bernard Drouin, all of Antony, France, assignors to Centre National du Machinisme Agricole, du Genie Rural, des Eaux et des Forets, Antony, France

Filed May 26, 1981, Ser. No. 267,297

Claims priority, application France, May 28, 1980, 80 11782

Int. Cl.³ B30B *1/00*

U.S. Cl. 100—214 **16 Claims**



1. A method of sustaining the oscillatory movement of an oscillating device of the type comprising a mass oscillating between dead points on opposite sides of a point of equilibrium with a potential force acting to return the mass toward the point of equilibrium, said potential force increasing when the mass recedes from said point of equilibrium and being maximum at said dead points and the speed of the oscillating mass being maximum adjacent said point of equilibrium, comprising applying from a motive source to said device a force superior to said maximum potential force at a speed lower than the speed of the device adjacent said point of equilibrium, the force of the motive source being applied to said mass on the portion of the path of movement of said mass preceding a said dead point, and the application speed of the force of the motive source being higher than what would be the instantaneous speed of said mass along said portion of its trajectory were said force of the motive source not applied.

4,503,768

SINGLE PIECE HAMMER MODULE

C. Gordon Whitaker, Mercer Island, Wash., assignor to Mannesmann Tally Corporation, Kent, Wash.

Filed Jul. 11, 1983, Ser. No. 512,470

Int. Cl.³ B41J *7/70*

U.S. Cl. 101—93.04 **7 Claims**

1. A print hammer module for a dot matrix line printer comprising:

a permanent magnet transversely polarized such that said

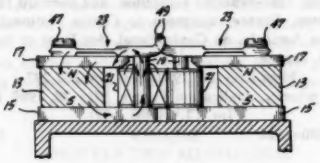
permanent magnet has a pair of opposed polarized faces lying parallel to one another;

a flux plate formed of a magnetically permeable material having a base and at least one arm, said base mounted on one of said polarized faces of said permanent magnet such that said arm extends outwardly in the plane defined by said one of said polarized faces;

at least one coil post formed of a magnetically permeable material mounted on the end of said arm of said flux plate so as to overlie said permanent magnet;

at least one coil, said at least one coil mounted on said at least one coil post;

a return plate formed of a magnetically permeable material having a base and at least one arm, said base mounted on said other of said polarized faces of said permanent magnet such that said arm extends outwardly in the plane of said other of said polarized faces toward said coil post, the length of said at least one coil post being such that the tip of said at least one coil post lies substantially coplanar with the face of said return plate facing away from said permanent magnet;



a print hammer formed from a single piece of magnetically permeable material, said print hammer having a base and at least one arm, said base attached to said base of said return plate such that said at least one arm of said print hammer overlies said at least one arm of said return plate, said at least one arm of said print hammer including a thin resilient region and a thick head region, said thin resilient region beginning at said base and extending outwardly therefrom at a slight angle with respect to the plane of said base, said thick head region located at the outer end of said thin resilient region, the length of said at least one arm of said print hammer being such that said thick head region overlies the outer end of said arm of said return plate and the tip of said post and is attracted to and impinges on the outer end of the arm of said return plate and the tip of said post by the magnetic field produced by said permanent magnet in the absence of current flow in said coil; and,

at least one print element attached to said thick head region of said print hammer on the side of said thick head region remote from said outer end of said at least one arm of said return plate and the tip of said post.

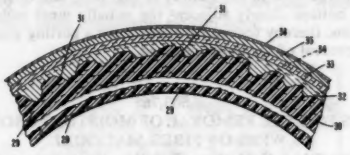
4,503,769

METAL COATED THIN WALL PLASTIC PRINTING CYLINDER FOR ROTOGRAVURE PRINTING

Dennis Andersen, Medford, N.J., assignor to Armotek Industries, Inc., Palmyra, N.J.

Filed Jun. 21, 1982, Ser. No. 390,379
Int. Cl.³ B41F 9/00
U.S. Cl. 101—153 **17 Claims**

11. A rotogravure printing cylinder comprising at least one etchable thin walled, plural metal coated hollow plastic cylinder sleeve comprising a thin walled hollow plastic cylinder having a pretreated textured or distorted surface, said plastic cylinder having a flame-sprayed zinc layer interlocked thereon by engagement of the flame-sprayed zinc layer with the textured or distorted surface of the plastic cylinder, a first copper layer applied on said zinc layer and a second copper layer of the same or greater hardness than the said first layer applied on



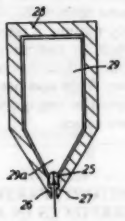
said first copper layer, said second copper layer being capable of being etched.

4,503,770

PRINTING MACHINE DOCTOR BLADES

Norman V. Cox, 43 W. Valley Rd., Hemel, Hempstead, Hertfordshire, England

PCT No. PCT/GB82/00253, § 371 Date Apr. 18, 1983, § 102(e) Date Apr. 18, 1983, PCT Pub. No. WO83/00656, PCT Pub. Date Mar. 3, 1983
PCT Filed Aug. 13, 1982, Ser. No. 491,204
Claims priority, application United Kingdom, Aug. 18, 1981, 8125242; Feb. 24, 1982, 8205461
Int. Cl.³ B41F 9/10
U.S. Cl. 101—169 **5 Claims**



1. In a doctor blade assembly, for inclusion in a printing machine having a frame structure and a printing cylinder rotatable in said frame structure, the improvement comprising:

(i) a mounting on said frame structure, including a pair of faces defining a blade guiding slot,

(ii) a plane doctor blade positioned in said slot between said faces and slidably guided thereby for movement, when in use, parallel to its own plane towards and away from the printing cylinder,

(iii) a backing member mounted on an edge of said doctor blade within said mounting, and

(iv) fluid-pressure actuated loading means for said doctor blade including a bag for selectively receiving and containing pressurized resiliently-compressible fluid, said bag being disposed within said mounting and abutting said mounting and said backing member for urging said blade to move in said slot outwardly towards said printing cylinder.

4,503,771

MECHANISM FOR ENGAGING, DISENGAGING AND ADJUSTING APPLICATOR ROLLERS WITH RESPECT TO THE PLATE CYLINDER OF PRINTING MACHINES

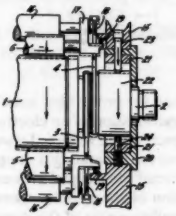
Joachim Herzel, Frankfurt am Main; Claus Simeth, Offenbach am Main; Rudolf Mitze, Dietzenbach, and Robert Ortner, Alzenau/Michelbach, all of Fed. Rep. of Germany, assignors to M.A.N. Roland Druckmaschinen Aktiengesellschaft, Offenbach am Main, Fed. Rep. of Germany

Filed Mar. 2, 1983, Ser. No. 471,502

Claims priority, application Fed. Rep. of Germany, Mar. 3, 1982, 3207622

Int. Cl.³ B41F *13/36*

U.S. Cl. 101—247 4 Claims



1. A mechanism for engaging, disengaging and adjusting applicator rollers with respect to the plate cylinder of a printing machine, the plate cylinder being mounted in eccentric bearings in the machine housing and the applicator rollers being adjustable with respect to the plate cylinder by adjustment means and being engageable with and disengageable from the plate cylinder by means of annular cam disks rotatable about the plate cylinder axis, wherein the improvement comprises, in combination,

the cam disks have camming zones for simultaneous adjustment of the center-to-center distance of all the applicator rollers with respect to the plate cylinder in the region of a predetermined engagement position and as far as a predetermined disengagement position,

the cam disks are pivotable with respect to end stops and adjustable stops,

the journal of the plate cylinder is mounted in additional bearing means for allowing a movement with respect to the eccentric bearings, and

the annular cam disks are mounted rotatably on the journal of the plate cylinder independently of the eccentric bearing and coaxially of the plate cylinder axis.

4,503,772

GRIPPER PAD HEIGHT ADJUSTING DEVICE FOR SHEET-FED ROTARY PRINTING PRESSES

Hidetaka Urakawa, and Toshiyuki Aoki, both of Ibaragi, Japan, assignors to Komori Printing Machine Co., Ltd., Japan

Filed Apr. 14, 1982, Ser. No. 368,174

Claims priority, application Japan, Apr. 21, 1981, 56-60387; Apr. 21, 1981, 56-60388

Int. Cl.³ B41F *1/30*

U.S. Cl. 101—409 27 Claims

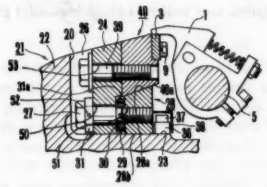
1. A gripper pad height adjusting device for adjusting a gripper pad means in relation to a plurality of grippers for gripping sheets in a sheet-fed rotary printing press, said gripper pad height adjusting device comprising:

a cylinder having a recess formed in its outer periphery;

an adjustment bar disposed in said recess and extending axially along said cylinder, said adjustment bar comprising at least two adjustment bar members each extending axially on a respective portion of said recess, said at least two adjustment bar members each comprising a first flat sloping surface;

at least one adjustment screw interconnecting said at least two adjustment bar members for simultaneously moving said at least two adjustment bar members in said axial direction in response to rotatable movement of said at least one adjustment screw for movement of said at least two adjustment bar members relative to said cylinder such as to displace each of said first flat sloping surfaces, said at least one adjustment screw extending in an axial direction relative to said cylinder;

at least one gripper pad bar disposed in said recess and extending parallel to said at least two adjustment bar members, said at least one gripper pad bar further being disposed radially outwardly of said at least two adjustment bar members; said at least one gripper pad bar further comprising at least one second flat sloping surface formed on said at least one gripper pad bar, said at least one second flat sloping surface abutting said first flat sloping surface, said first and said at least one second flat sloping surfaces sloping downwardly relative to said axial direction such that said movement of said at least two adjustment bar members in said axial direction in response to said rotatable movement of said at least one adjustment screw results in radial movement of said at least one gripper pad bar relative to said cylinder;



selectively disengageable interconnection means fixedly interconnecting said at least one gripper pad bar with said cylinder such that said at least one gripper pad bar is radially adjustably positionable relative to said cylinder by selectively disengaging said selectively disengageable interconnection means and by rotatable movement of said at least one adjustment screw to provide relative movement of said first and said at least one second flat sloping surfaces;

biasing means mechanically interposed said selectively disengageable interconnection means and said at least two adjustment bar members, said biasing means urging said first and said at least one second sloping surfaces into mutual engagement;

a plurality of gripper pads mounted on said at least one gripper pad bar, said plurality of gripper pads being adjustably positionable relative to said plurality of grippers by said radial movement of said at least one gripper pad bar; and

said plurality of grippers being pivotally mounted to said cylinder, each of said plurality of grippers further being selectively engageable with a respective one of said plurality of gripper pads.

4,503,773

AFT END IGNITER FOR FULL, HEAD-END WEB SOLID PROPELLANT ROCKET MOTORS

Christopher W. Bolieau, Brigham City, Utah, assignor to Thiokol Corporation, Chicago, Ill.

Filed Dec. 27, 1982, Ser. No. 453,318

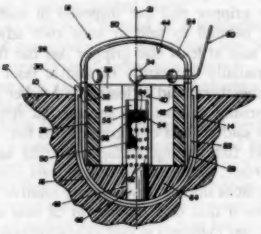
Int. Cl.³ F02K *9/18, 9/30, 9/95*

U.S. Cl. 102—202 8 Claims

1. An igniter for a rocket motor including a solid propellant haing an aft-end surface, said igniter being mounted in a cavity formed in the said surface of the propellant and being operative to project a stream of flaming gas thereon, comprising:

a plastic liner for lining the cavity formed in the surface of the propellant,

a closed pressure vessel having walls and a longitudinal axis, said pressure vessel being positioned in and fastened securely to said liner with a portion extending axially there-



from, said portion of said vessel having a plurality of nozzles therein formed transversely of said axis,

a hollow cylindrical solid propellant contained in said pressure vessel, and

means to ignite said hollow cylindrical solid propellant.

4,503,774

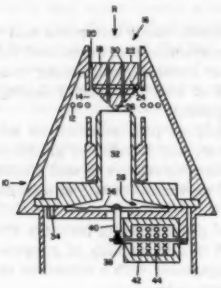
SELF-REGULATING AIR DRIVEN POWER SUPPLY

Carl H. Campagnuolo, Potomac, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 2, 1983, Ser. No. 490,266

Int. Cl.³ F42C *11/00*; F15C *1/08*

U.S. Cl. 102—207 **15 Claims**



1. An air driven resonator comprising:

a. an enclosed volume having an open end and a closed end and defining a resonant cavity;

b. a tubular air inlet means having a first diameter for allowing air to enter the resonant cavity;

c. a cylindrical nozzle-centerbody having a second diameter smaller than the first diameter and positioned within the air inlet means to form an annular orifice to direct an annular column of air into the resonant cavity; and

d. a plurality of air passageways passing through said nozzle-center body for producing control jets to deflect portions of the air flow away from the resonant cavity.

4,503,775

ELECTROMAGNETIC PROXIMITY FUSE

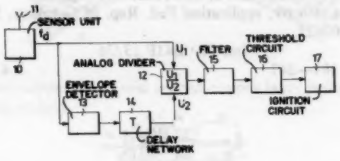
Gunnar G. Thordarson, Järfälla, Sweden, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 25, 1983, Ser. No. 478,925

Claims priority, application Sweden, Apr. 6, 1982, 8202181

Int. Cl.³ F42C *13/04*

U.S. Cl. 102—214 **6 Claims**



1. A proximity fuse for projectiles, missiles or the like comprising means for transmission of an electromagnetic wave for reflection by an object, which reflected wave is combined with the transmitted wave for generating a doppler signal, which is fed to an ignition circuit via a signal processing circuit, where the dynamic variation of the doppler signal is determined by comparing the prevailing value of the doppler signal with the value of the doppler signal a given time interval previously, characterized in that the signal processing circuit comprises a divider which at one input receives the doppler signal and at a second input receives a delayed version of the doppler signal, and which divider delivers a signal of doppler frequency, the amplitude of which corresponds to the quotient of the prevailing value of the amplitude of the doppler signal divided by the amplitude of the delayed version of the doppler signal, which signal of doppler frequency is fed to the ignition circuit via a filter having a frequency characteristic which is approximately represented by the expression:

$$1/(f+f_o)$$

where f_o is a system parameter and f is the frequency of the input signal, thus equal to the frequency f_d of the doppler signal, triggering of the ignition circuit taking place when the output signal of the filter exceeds a certain level and the constant f_o being so dimensioned in combination with the triggering level that the ignition circuit is triggered at a given distance from the reflecting object.

4,503,776

FRAGMENTATION BODY FOR FRAGMENTATION PROJECTILES AND WARHEADS

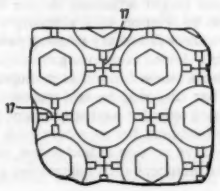
Helmut Nussbaum, Bauler, and Adolf Weber, Neukirchen, both of Fed. Rep. of Germany, assignors to Diehl GmbH & Co., Nuremberg, Fed. Rep. of Germany

Filed Nov. 30, 1981, Ser. No. 334,834

Claims priority, application Fed. Rep. of Germany, Dec. 2, 1980, 3045361

Int. Cl.³ F42B *13/18*

U.S. Cl. 102—496 **9 Claims**



1. Fragmentation body for fragmentation projectiles and

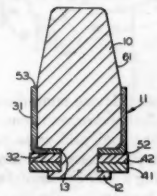
warheads, including a plurality of prefabricated fragments molded into a tubular fragmentation shell constituted of cast material; the improvement comprising: each of said fragments having a projectile-like configuration including a pointed tip and a base portion, and a recess being formed in the base portion, flight trajectory-stabilizing fins being formed on each of said fragments and providing highly-stressed rupturing zones in the cast material of the fragmentation shell, whereby upon impact against a target said fragments rupturing along said rupturing zones to facilitate maximized penetrating and fragmentation effects upon impacting against the target.

4,503,777

SEMI-JACKETED BULLET HAVING INTEGRAL JACKET RETAINING MEANS, AND METHOD OF MAKING

Russell Young, R.D. 1, Box 119A, Broadalbin, N.Y. 12025

Filed Oct. 30, 1981, Ser. No. 316,933
Int. Cl.³ F42B *11/08*
U.S. Cl. 102—514 **10 Claims**



1. A molded bullet comprising:
a core of soft metal material having a nose end and a base end;
a cup shaped jacket of material harder than said soft metal material having a cylindrical upper portion and a circular base portion substantially surrounding said base end of said core and so surrounding said core to prevent contact between said soft metal material and a weapon barrel upon firing said bullet through said barrel and having an opening in said base portion; wherein the distance between inner and outer surfaces of said cylindrical upper portion is less than ten percent of the diameter of said bullet; and
a retaining flange of said soft metal material, formed integrally with said core, extending through said opening for a distance less than twenty percent of the length of said bullet and overlying a portion only of said base portion to prevent contact between said flange and said weapon barrel.

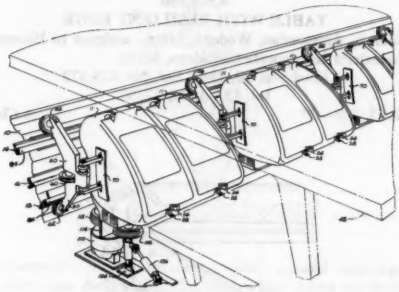
4,503,778

TRANSPORTATION SYSTEM

Fillmore G. Wilson, 10807 Candlewood, Houston, Tex. 77042

Filed Jan. 22, 1982, Ser. No. 341,961
Int. Cl.³ B61B *1/02, 3/00*
U.S. Cl. 104—28 **15 Claims**

1. A transportation system for rapidly loading people from a platform into and from a plurality of vehicles comprising:
an elongated vehicle trackway extending along said people loading platform;
trolleys extending between said vehicle trackway and said vehicles supporting said vehicles on said trackway;
side entrance openings formed in said vehicle facing said loading platform, a lowermost portion of said side entrance openings being generally level with said loading platform;
side doors carried on and extending along the length of said vehicles for closing said side entrance opening, said side doors being generally parallel to said vehicle trackway facing and opening towards said loading platform;
hinges carried adjacent a top portion of said side doors securing said doors to said vehicles permitting said doors to be opened from the bottom providing access to said cars;
a single row of seats carried in said vehicles facing said doors and said loading platform;
latch means carried adjacent the bottom of said doors holding said doors closed;
means carried by said loading platform for disengaging said latch means as said cars are positioned along the side of said platform and for releasing said latch means; and



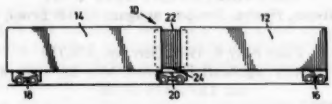
means for raising said doors after release of said latch including power driven door actuators carried adjacent said loading platform external to said vehicles that remain fixed with respect to motion of said vehicle, and door flanges carried on a portion of said doors for engagement by said door actuators, whereby said doors are raised vertically upon engagement and actuation of said actuators on said door flanges.

4,503,779

INTERCONNECTING PASSAGE FOR ARTICULATED VEHICLE

Dennis P. Chadwick, Napanee, Canada, assignor to Urban Transportation Development Corporation Ltd., Toronto, Canada

Filed Feb. 25, 1982, Ser. No. 352,232
Claims priority, application Canada, Feb. 26, 1981, 371834
Int. Cl.³ B61D *17/14, 17/20*; B61F *3/12*
U.S. Cl. 105—4 R **11 Claims**



1. An articulated vehicle comprising a first chassis and a second chassis, each having an outboard and an inboard end, coupling means interconnecting said inboard ends and including vertical pivot means to accommodate relative movement of said chassis about a generally vertical axis for steering movement of said vehicle and horizontal pivot means to accommodate relative pivotal movement of said chassis about a generally transverse horizontal axis for relative vertical movement between said outboard ends, and a tunnel structure interconnecting said chassis, said tunnel structure including a first pair of laterally spaced upstanding partitions mounted on one of said chassis and defining a first passage, a second pair of laterally spaced upstanding partitions mounted on the other of said chassis and defining a second passage, a pair of upstanding side walls located inwardly of said partitions and each extending between said first and second passages to define a continuous passageway from said one chassis to the other, said side walls

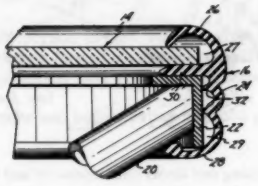
each including a stationary portion and a movable portion pivotally connected to said stationary portion for movement about an axis inclined to the axis defined by said vertical pivot means, said movable portions each having an edge abutting an adjacent partition, whereby upon movement of any partition relative to its associated side wall upon relative movement between said chassis about a horizontal axis, the associated movable portion moves about its respective inclined axis to follow the movement of the associated partition.

4,503,780

TABLE WITH RESILIENT EDGE

Arthur A. Apissomian, Wadena, Minn., assignor to Homecrest Industries Incorporated, Wadena, Minn.

Filed Sep. 30, 1982, Ser. No. 429,972
Int. Cl.³ A47B *17/00*
U.S. Cl. 108—27 **6 Claims**



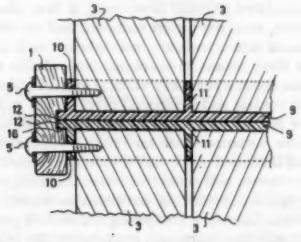
1. A furniture construction comprising:
a floor engaging base;
a rigid rim attached to the base;
a panel member disposed above the rim;
a flexible resilient continuous loop edging having an outer portion and an upper lip, a lower lip and an intermediate resilient flange projecting from the outer portion, the flange being spaced from and between the upper and lower lip with the lower lip and intermediate flange elastically engaging the rigid rim and the upper lip and intermediate flange elastically engaging a perimeter edge portion of the panel member placing the panel member in a spaced relationship from the rim and providing a cushion between the panel member and the rim and securing the panel member to the rim.

4,503,781

PREFABRICATED SHELF UNIT

Maths Nilsson, Hestra, Sweden, assignor to AB Ernol, Hestra, Sweden

Filed May 4, 1982, Ser. No. 374,715
Claims priority, application Sweden, May 29, 1981, 8103410
Int. Cl.³ A47B *57/00*
U.S. Cl. 108—64 **5 Claims**



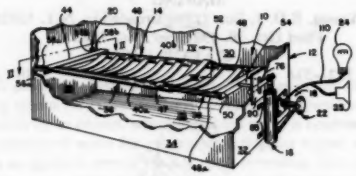
1. Prefabricated shelf unit comprising a plurality of vertical columns provided with recesses, a plurality of shelves fixed to the columns and a plurality of cross members for receiving end portions of the shelves, said cross members provided with projections extending into said recesses, wherein said cross members are provided with end wall portions contacting said columns, said end wall portions fixedly secured between the columns and the shelves by tensioning element means extending through the end walls to interconnect the shelves and the columns.

4,503,782

WOOD STOVE GRATE KIT WITH LOW WOOD SIGNAL

Marty D. Helton, 280 Lake St., Sand Lake, Mich. 49343

Filed Apr. 13, 1983, Ser. No. 484,434
Int. Cl.³ F23N *5/18*
U.S. Cl. 110—186 **13 Claims**



1. A solid fuel burning device comprising:
a firebox including first and second generally opposite walls;
a grate for supporting fuel, said grate being extendable between first and second ends, said grate including a first grate half including a pair of parallel side members and a plurality of fuel supporting members extending therebetween, said grate further including a second grate half including a pair of parallel side members and a plurality of fuel supporting members extending therebetween, said second grate half side members being telescopically received within said first grate half side members, said fuel supporting members of both grate halves being concave upwardly;
hinge means for pivotally supporting said first grate end adjacent said first firebox wall for movement in a generally vertical plane;
a spring-loaded scale including attaching means for attaching said scale to the exterior of said second firebox wall;
coupling means adapted to extend through said second firebox wall for coupling said second grate end and said scale, whereby said scale is responsive to the weight of said grate and any fuel supported thereon; and
signal means responsive to said scale for emitting a signal when said scale indicates that said grate and any fuel supported thereon has attained a predetermined minimum weight, whereby said signal means is actuated when said firebox must be reloaded to prevent the fire from burning out.

4,503,783

FURNACE ASH AIR SEAL

Albert Musschoot, Barrington, Ill., assignor to General Kinematics Corporation, Barrington, Ill.

Filed Jul. 11, 1983, Ser. No. 512,173
Int. Cl.³ F23G *5/00*
U.S. Cl. 110—165 R **10 Claims**

1. In a combustion apparatus of the type having a combustion chamber for burning solid fuels from which unburned residue is developed, the improvement comprising:
a sealing chamber into which at least a portion of the residue is transferred and having an outlet adjacent the bottom of the sealing chamber;
first means for transferring residue between the combustion chamber and the sealing chamber to form a column of residue in the sealing chamber;
means aligned with the bottom of the sealing chamber for

supporting at least part of the weight of the residue in the sealing chamber;

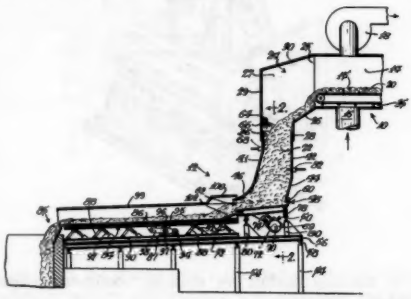
means for vibrating the last named means to compact the residue in the sealing chamber and at the same time to convey some of the residue from the sealing chamber,

a first level detector located in the sealing chamber for detecting the maximum height of the residue in the sealing chamber and for activating the vibrating means;

a second level detector located in the sealing chamber for detecting a minimum height of the residue in the sealing chamber and for shutting off the vibrating means; and

said column of residue provides resistance to the passage of air from the atmosphere through the sealing chamber so as to maintain a negative pressure in the combustion chamber.

6. In a combustion apparatus of the type having a combustion chamber for burning solid fuels from which unburned residue is developed, the improvement comprising:



a generally vertically disposed sealing chamber into which at least a portion of the residue is transferred, an outlet at the lower portion of said sealing chamber:

means aligned with the outlet for supporting the column of residue and for conveying the residue accumulated in the sealing chamber to a point of disposal; and

level detectors provided in the sealing chamber to sense the maximum and minimum level of the residue in the sealing chamber, one of said detectors sensing the maximum height of the column and activating the conveying means to lower the level of the residue within the chamber and the other detector sensing the minimum height of the column and deactivating the conveyor means so that the height of the residue in the chamber will increase;

said column of residue collecting in the sealing chamber to provide resistance to the passage of air under atmospheric pressure through the sealing chamber and into the combusfion chamber whereby the combustion chamber is maintained under a negative pressure.

4,503,784

DOOR CLOSURE ASSEMBLY FOR INCINERATORS, FURNACES, AND OVENS

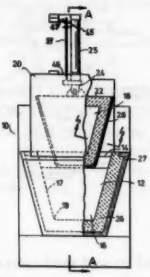
Bozena Turecek, Brampton, Canada, assignor to Trecan, Ltd., Mississauga, Canada

Filed May 16, 1983, Ser. No. 495,100
Int. Cl.³ F23M *7/00*
U.S. Cl. 110—176 **9 Claims**

1. A closure assembly for use with an incinerator or furnace, the furnace having a vertical wall defining an opening therein, a portion of the wall extending outwardly from the plane of the wall and defining, in a generally vertical plane, a furnace sealing structure for receiving a door moveable in a vertical direction, the structure having a recess with an open end at the top and having sides converging from the open end to a generally horizontal base;

a door of a complementary shape to the structure and moveable in the vertical direction in the same vertical plane as the structure between the open end and the base;

door moving means coupled to the door for raising and lowering the door to define respective open and closed positions, the door being coupled to the door moving means by a pivotable connection at the top of the door which permits the door to self-center as it is closed; and



compressible sealing means provided around convergent sides, base and front of the door which when the door is fully closed is compressed to form a substantially gastight seal between the door and the opening;

whereby when the door is lowered by said door moving means into the closed position, the door self-centers and the sides of the door engage the sides of the structure in a wedging action, the sealing means being compressed when the door fully closes the opening.

4,503,785

METHOD FOR REDUCTION OF SULFUR CONTENT IN EXIT GASES

Peter M. Scocca, P.O. Box 876, Lilburn, Ga. 30247

Continuation of Ser. No. 159,457, Jun. 16, 1980, abandoned. This application Feb. 17, 1983, Ser. No. 467,152
Int. Cl.³ F23J *11/07*; C10L *10/04*
U.S. Cl. 110—342 **5 Claims**

1. A method of reducing the sulfur content of exit gases exhausted from the burning chamber of an industrial boiler of a power generating plant and the like having an open flue and in which sulfur-bearing fuels are burned, said method comprising the steps of:

continuously moving a stream of sulfur-bearing fuel into the burning chamber;

adding to the stream of fuel prior to the fuel entering the burning chamber an aqueous solution of calcium nitrate so that the fuel and the calcium nitrate solution move together into the buring chamber;

igniting the sulfur-bearing fuel and the calcium nitrate in the buring chamber in an open flame; and

reducing the amount of sulfur available for conversion to sulfur oxide gases, by reaction between the calcium nitrate solution and reactive components in the sulfur-bearing fuel.

4,503,786

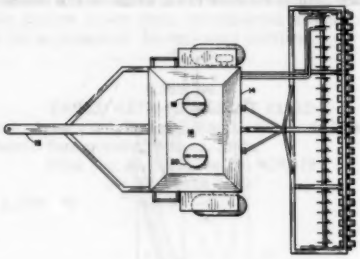
GRAIN DRILL WITH SEALED BIN AIR-POWERED DISTRIBUTION

Rexford L. Tautfest, Rte. 1, Box 27, Marland, Okla. 74644

Continuation-in-part of Ser. No. 219,822, Dec. 24, 1980, abandoned. This application Jan. 14, 1983, Ser. No. 457,869
Int. Cl.³ A01C *7/00, 15/04*
U.S. Cl. 111—86 **11 Claims**

1. A seed cup for metering particulate matter comprising a sealed bin for said particulate matter and a pneumatic seed conveying conduit therebelow, a P-shaped housing defining a bowl portion connected to a vertical stem portion, said bowl

portion of said P-shaped housing sealably positioned inside at the bottom of said bin, an opening at the front of said bowl portion exposed to said particulate matter said stem portion of said P-shaped housing being a conduit that extends below said bowl portion sealably outward the bottom of said bin and



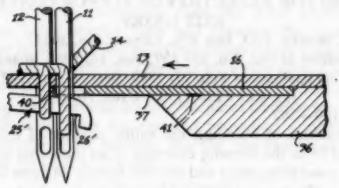
transversely connected to said seed conveying conduit, a star wheel positioned in said bowl portion behind said opening, and means to rotate said star wheel wherein particulate matter will be directed by said star wheel along the bottom of said housing into said conduit forming said stem portion.

4,503,787

LOW PILE NEEDLE PLATE FOR A TUFTING MACHINE

Charles W. Watkins, Ooltewah, Tenn., assignor to Tufteo Corporation, Chattanooga, Tenn.

Filed Oct. 4, 1983, Ser. No. 538,944
Int. Cl.³ D05C *15/00*
U.S. Cl. 112—79 R **9 Claims**



1. In a multiple needle tufting machine having a transverse row of reciprocable needles for carrying yarn through a base fabric movable longitudinally through the machine, and a looper hook for each needle having a bill for seizing and forming a loop in each yarn carried through the base fabric by the corresponding needle, fabric support means for supporting the base fabric between the needles and the looper hooks, comprising:

(a) an elongated needle plate having a longitudinal dimension and a transverse dimension, and being integrally formed of solid material substantially throughout its longitudinal and transverse dimensions,

(b) said needle plate having a free transverse edge portion, and having a thickness substantially less than the portions of the looper hook seizing the yarn carried by a corresponding needle,

(c) a support member having a rear portion extending transversely of the machine,

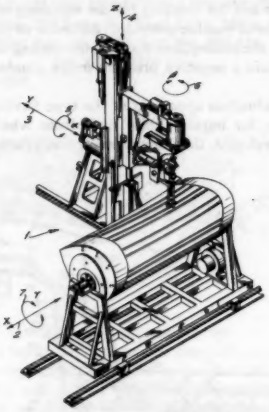
(d) means fixing said needle plate to said support member so that said free edge portion extends transversely of the machine, closely adjacent the reciprocable paths of the transverse row of needles, and spaced rearward of said rear portion sufficient to permit free, unobstructed reciprocable movement of the looper hooks at an elevated position beneath and closely adjacent said needle plate.

4,503,788

TRANSLAMINAR STITCHING APPARATUS FOR COMPOSITE AIRFRAME PART ASSEMBLY

Ottavio Giannuzzi, Baldwin, and Ronald C. Braun, West Islip, both of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Sep. 24, 1982, Ser. No. 423,485
Int. Cl.³ D05B *21/00*
U.S. Cl. 112—121.12 **16 Claims**



1. A stitching module for stitching composite laminate workpieces comprising:

(a) means for stitching the workpieces,

(b) means for supporting the workpieces during stitching,

(c) a plurality of drive means engaging said stitching means for translating and/or rotating said stitching means so that said stitching means can stitch straight and/or contoured paths along the surfaces of the workpieces, and

(d) control means connected to said drive means for controlling the operation of said drive means, said plurality of drive means comprising:

(1) means for translating said stitching means along three orthogonal, translational axes, said translating means engaging said stitching means and being connected to said control means; and

(2) means for rotating said stitching means along three rotational axes, each of said rotational axes surrounding an axis parallel to one of said translational axes, said rotating means engaging said stitching means and being connected to said control means.

4,503,789

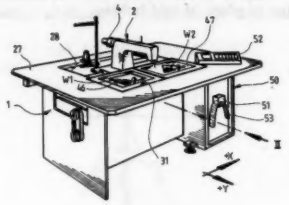
AUTOMATIC SEWING MACHINES

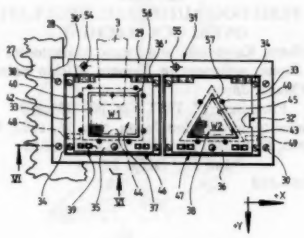
Hans Scholl, Oerlinghausen-Lipperreihe, Fed. Rep. of Germany, assignor to Kochs Adler AG, Bielefeld, Fed. Rep. of Germany

Filed Apr. 20, 1983, Ser. No. 486,744
Int. Cl.³ D05B *21/00*
U.S. Cl. 112—121.14 **4 Claims**

1. An automatic sewing machine having a computer for producing a trajectory as a relative movement between a sewing head with a needle and workpieces to be sewn in a plane substantially perpendicular to the direction of movement of the needle, computer-controlled servomotors for moving the sewing head in two perpendicularly directed coordinate directions for producing the said relative movement, a fixed workpiece holder with at least two workpiece clamps for receiving in each case one workpiece, thread cutting means, each workpiece clamp being independently operable to permit removal of a first workpiece while sewing a seam on a second workpiece, said computer being programmed in such a way

that the sewing process takes place along the trajectory in accordance with a previously fed-in program, so that after sewing a seam on a first workpiece, the thread cutting means





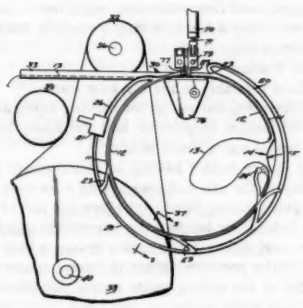
are operated, the sewing head is then moved over the second workpiece without performing a sewing process and then a further seam is sewn, which is ended by operating said thread cutting means.

4,503,790

AUTOMATIC ELASTIC LOOP FORMING

John H. Keeton, P.O. Box 296, Campbellsville, Ky. 42718

Filed Sep. 30, 1982, Ser. No. 429,426
Int. Cl.³ D05B *23/00*
U.S. Cl. 112—121.27 **26 Claims**



1. A method for forming an elastic band loop of any desired circumference, utilizing an annular channel having a fixed circumference and an overfeed opening; comprising the steps of:

(a) automatically feeding a predetermined length of an elastic band, at least as great as the circumference of the channel, into the channel from a supply of elastic band, with any length of band in excess of the channel circumference traveling into the overfeed opening, the length of band being fed being determined independent of the channel circumference;

(b) automatically severing the band from the supply once the predetermined length thereof has been fed into the channel, to provide an elastic loop with a pair of adjacent free ends;

(c) automatically removing the predetermined length band loop from the channel; and

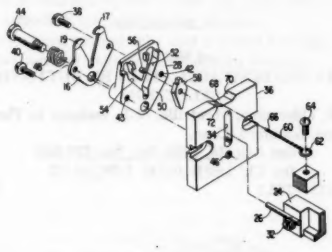
(d) automatically effecting closing of the loop by affixing the free ends thereof together.

4,503,791

CAM CONTROLLED GATE SPRING FOR CHAIN STITCH SEWING MACHINE

Karl H. Killinger, Dover, N.J., assignor to The Singer Company, Stamford, Conn.

Filed Apr. 16, 1984, Ser. No. 600,928
Int. Cl.³ D05B *3/14, 57/02, 97/02, 97/10*
U.S. Cl. 112—199 **5 Claims**



1. In a sewing machine; a needle, a frame, means mounted on the frame for reciprocating the needle; a looper and cam assembly, the cam including a pair of intersecting cam tracks, and said cam having a gate pivotally mounted thereon; resilient means biasing the looper and cam assembly axially into a limited position in the frame; an actuator engageable with the cam on said cam tracks in the limited position of the assembly for imparting reciprocatory pivotal movement to said assembly and disposing the looper points for cooperation with the needle in the formation of chain stitches; a spring having one end affixed in the machine and a free end to alternately engage opposite side edges of the gate and move the gate into positions controlling actuator movement between the tracks; and a fixed member having camming surfaces thereon engageable by the spring with flexure thereof by the gate for lifting the free end of the spring to the top of the gate for passage from one side to the other.

4,503,792

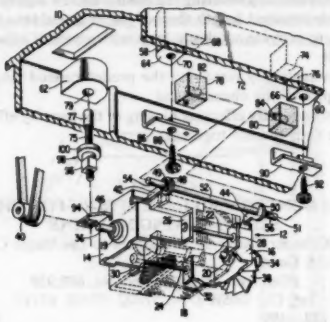
PIVOTABLE MOTOR WITH MOUNTING PIN

Albert N. Cook, Madison, N.J., assignor to The Singer Company, Stamford, Conn.

Filed Sep. 9, 1983, Ser. No. 530,911
Int. Cl.³ D05B *69/00*
U.S. Cl. 112—220 **6 Claims**

1. In a sewing machine, an electric motor including sheet metal end brackets with integral parallel arms; a frame extending over the motor including a pair of depending bosses; an elongate pin extending between and supported in end portions of the parallel arms on the end brackets, the pin extending parallel to the motor shaft and including opposite end portions which project beyond the end portions of said parallel arms; a resilient block wherein one of the end portions of the pin is supported; another resilient block wherein the other end portion of the pin is supported; clamps secured to said bosses and in enforced engagement with the resilient blocks for affixing

the blocks in the frame; a power transmission belt in the machine drivable by the motor; and means for pivoting the motor



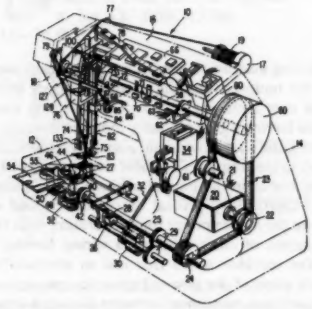
about the axis of said pin to effect a tension adjustment in the belt.

4,503,793

BOBBIN WINDING ACTUATION BY BUTTONHOLE SELECTION

Charles R. Odermann, Montville, N.J., assignor to The Singer Company, Stamford, Conn.

Filed Aug. 24, 1983, Ser. No. 525,869
Int. Cl.[3] D05B 59/00, 3/06, 69/02
U.S. Cl. 112—262.1 1 Claim



1. A method for implemnting winding of a lower thread bobbin in place in a looptaker of a sewing machine from an upper thread spool, said sewing machine having a frame, an endwise reciprocal needle bar supported by said frame, a sewing needle supported in the end of said needle bar to undergo endwise reciprocation, means for selectively actuating said needle bar in endwise reciprocation, a presser bar, means for selectively disconnecting said actuating means from said needle bar to suspend endwise reciprocation of said needle bar while continuing actuation of said actuating means, pattern selection means including a buttonhole pattern selector for implementing selective lateral oscillations of said needle bar and sewing needle affixed thereto, wherein the buttonhole pattern is of a variety in which at least one stitch is effected at a first end of the buttonhole after which the disconnecting means is actuated to feed the work material to the opposite end of the buttonhole as indicated by a traveling buttonhole foot having means thereon to reinitiate endwise reciprocation of the needle bar, the method comprising the steps of:

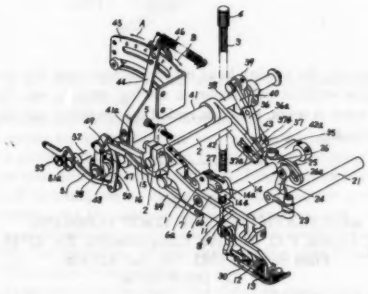
selecting said buttonhole pattern selector but without having said traveling buttonhole foot carried by said presser bar to reinitiate endwise reciprocation of said needle bar; and actuating said actuating means to initiate at least one stitch of said buttonhole in center needle position to bring upper thread down to said lower thread bobbin and thereafter disconnecting said actuating means from said needle bar to suspend endwise reciprocation of said needle bar while continuing actuation of said actuating means to implement winding in place of said bobbin.

4,503,794

UPPER FEED DOG AUTOMATIC REGULATOR FOR OVERLOCK MACHINE

Keiichi Ishihara, Kawanishi, and Fumio Matsumoto, Takatsuki, both of Japan, assignors to Yamato Mishin Seizo Kabushi Kaisha, Osaka, Japan

Filed Sep. 12, 1983, Ser. No. 531,470
Claims priority, application Japan, Sep. 16, 1982, 57-161826; May 17, 1983, 58-86042; May 17, 1983, 58-86043
Int. Cl.[3] D05B 27/08
U.S. Cl. 112—313 5 Claims



1. An upper feed dog automatic regulator in an overlock machine for sewing a fabric having a variable thickness, said regulator comprising:

a machine frame;

an axis fixed rotatably in the machine frame;

an upper feed dog bar means for moving along an elliptical locus of motion lengthwise and vertically between an upper bound and a lower bound;

an upper feeder holder having an intermediate part fitted rotatably to the axis and also having a forward part;

a sliding guide means, fitted to the forward part of the upper feeder holder, for holding the upper feed dog bar means therein, said sliding guide means having a base end;

an upper feeder pressure bar spring means, connected to the base end of the sliding guide means, for pressing down said sliding guide means;

an upper feeder pressure bar spring regulating screw means, threaded in the machine frame, for adjusting the pressing down force of the spring means; and

separate front and rear upper feed dogs fitted to the upper feed dog bar means;

whereby the lower bound in the elliptical locus of motion of the upper feed dog bar means varies automatically in response to the thickness of the fabric being sewn so as to avoid uneven material feed, puckering between the front and rear upper feed dogs, and other sewing trouble.

4,503,795

SAILING CRAFT

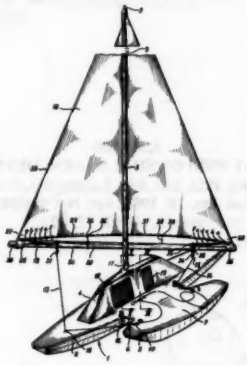
Richard Krans, Rozenstraat 34, 6814 EG Arnhem, Netherlands

Continuation of Ser. No. 305,899, Sep. 25, 1981, abandoned. This application Feb. 13, 1984, Ser. No. 578,609

Claims priority, application Netherlands, Sep. 30, 1980, 8005425

Int. Cl.³ B63H 9/04

U.S. Cl. 114—39 4 Claims



1. A sailing craft comprising:

a center cross-plane symmetric hull having a mast connected thereto such that the mast or the axis thereof intersects the line of intersection between the plane of the water line and the center cross-plane at a point beyond the center of said intersection, said mast being provided with means for securing a sail, including a boom and sheets connected thereto for controlling said sail,

a pair of rudders mounted symmetrically with respect to the cross-plane,

the bottom side of said hull being characterized at least mainly by a substantially flat plane inclined at an acute angle of from 10° to 20° with respect to the water line,

the line of intersection between said flat plane and the plane of the water line being at the same side of the center of the intersection between the cross-plane and the plane of the water line at the point of intersection between the axis of the mast and the line of intersection formed between the cross-plane and the plane of the water line,

the longitudinal axis of said rudders being coaxial to the axis of rotation of each of said rudders and being perpendicular to the inclined flat plane of said hull.

4,503,796

ROTATABLE SPAR

David A. Bierig, 955 W. 4th St., Erie, Pa. 16507

Filed Apr. 2, 1982, Ser. No. 365,019

Int. Cl.³ B63H 9/06

U.S. Cl. 114—89 16 Claims

1. In combination a sail and a spar,

said sail having a leech, luff and foot,

said spar having a first end and second end and being curved therebetween,

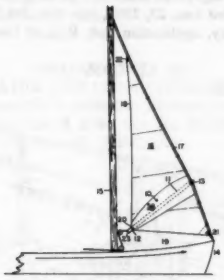
said sail having a pocket therein extending from said leech to said luff of said sail,

said spar being in said pocket,

said pocket being wide enough to allow said spar to rotate 180° without lifting said sail,

means on said first end of said spar to rotatably support said first end of said spar on said leech of said sail and bearing means on said second end of said spar to rotatably attach it to said luff to said sail whereby said spar will rotate during tacking,

said spar comprises a tubular member and said bearing



means on said second end of said spar comprises a second tube extending into said tubular member,

a collar on said second tube and a thrust bearing on said tubular member engaging said tubular member.

4,503,797

SAIL ROLLING AND STORING DEVICE

Suzanne M. Maurin, Le Puy, France, assignor to Societe Anonyme: Leisystem, France

Filed Oct. 20, 1982, Ser. No. 435,297

Claims priority, application France, Oct. 23, 1981, 81 20274

Int. Cl.³ B63H 9/10

U.S. Cl. 114—106 16 Claims

1. A device for rolling and storing a sail on any kind of rolling and furling boom for storing and protecting, against rain and sun rays, a sail extending substantially between the boom and a mast supporting the boom, the device comprising a sheath of flexible material which:

(a) encompasses the boom and extends over substantially the entire length thereof;

(b) includes rectilinear and rigid edges defining a slit disposed parallel to the longitudinal axis of the boom and disposable at the upper portion thereof for passing the sail therethrough;

(c) is carried by the boom for free swinging movement around the longitudinal axis of the boom; and

(d) includes a transverse cross-sectional area at least equal to that of the boom and the sail completely rolled thereon.

4,503,798

APPARATUS FOR REMOVING FIBER BALES, IN PARTICULAR PRESSED BALES OF COTTON

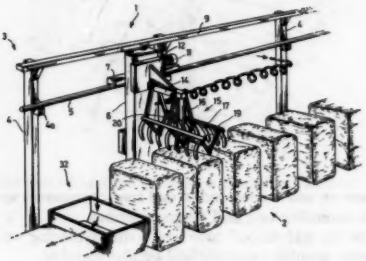
Hubert Hergeth, Dülmen, Fed. Rep. of Germany, assignor to Hergeth Hollingsworth GmbH, Fed. Rep. of Germany

Filed Jun. 23, 1982, Ser. No. 391,361

Claims priority, application Fed. Rep. of Germany, Jun. 23, 1981, 3124635

Int. Cl.³ D01G *13/00*

U.S. Cl. 414—225 **6 Claims**



1. Apparatus for removing fiber bales arranged in a row comprising a carriage, means for moving said carriage along a predetermined path of travel along which a row of fiber bales are adapted to be disposed, a slide, means for mounting said slide for vertical reciprocal movement relative to said carriage, means for selectively grabbing and releasing fiber bales individually from the associated row of fiber bales, means for supporting said grabbing and releasing means in cantilever relationship relative to said slide, means for sensing the presence of a bale in response to downward movement of said slide, means responsive to said sensing means for operating said grabbing and releasing means, said responsive means includes a fluid motor defined by a cylinder and a piston rod, a tackle line connected to said slide and entrained about said rod, and said tackle line having an end connected to a switch element carried by said piston.

4,503,799

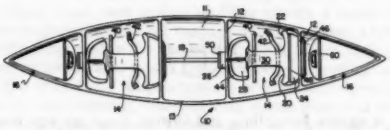
COMBINATION FLOTATION STORAGE AND SEATING STRUCTURES FOR BOATS

William E. Masters, 313 Dogwood La., Easley, S.C. 29640

Filed Apr. 28, 1982, Ser. No. 372,666

Int. Cl.³ B63B *35/72*

U.S. Cl. 114—363 **22 Claims**



1. For use in a boat having a bow, a stern, a hull extending from said bow to said stern, said hull having upwardly extending sides defining a cockpit area therebetween, said cockpit area having a floor, a device comprising:

a removable, water tight hollow body;

means mounted on said hollow body for gaining access to the interior of said hollow body;

means formed on said hollow body for attaching said body to said hull; and

an area formed on said hollow body and constructed to permit a person to be supported on said hollow body, said area including a downwardly curved saddle area having sufficiently small width and height dimensions to permit a person to straddle said hollow body in a kneeling position using said cockpit floor, and a separate substantially horizontal seat area formed at a height above the height of said saddle area for permitting a person to sit erect.

4,503,800

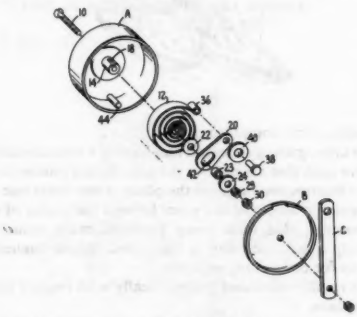
HEAT RESPONSIVE ALARM DEVICE

Carter L. Schliep, P.O. Box 485, Laytonville, Calif. 95454

Filed Jan. 18, 1983, Ser. No. 458,945

Int. Cl.³ G08B *17/00*

U.S. Cl. 116—221 **5 Claims**



1. A heat responsive alarm device adapted to be in heat conductive communication with a stove device comprising,

an exterior metal casing having a skirtlike sidewall member of sufficient depth to enclose the elements mounted thereon,

a centrally disposed screw means mounted on said metal casing extending therethrough and terminating beyond the depth thereof,

a base plate adapted to be connected to said metal casing by said screw means at a point thereon beyond the elements mounted in said metal casing,

a heat responsive bimetallic coil spring fixedly mounted at its inner end on said screw means within said casing to thereby prevent movement of the inner end of said coil spring relative to said casing and the outer end of said coil spring extending toward said sidewall member of said metal casing,

a rotatable clapper element mounted on said outer end of said bimetallic coil spring for direct engagement with said sidewall member,

trigger rod means adjacent said casing adapted to restrain movement of said rotatable clapper element during expansion or contraction of said bimetallic coil spring until the pressure exerted thereon due to fluctuations in the temperature thereof in excess of or below a preselected value result in expansion or contraction of said spring cause said clapper element to move radially by expansion or contraction to snap past said trigger rod means and against said sidewall of said metallic casing to thereby sound a bell alarm.

4,503,801

APPARATUS FOR IMPREGNATING OR DISPERSING A PRODUCT IN A THIN SUBSTRATE

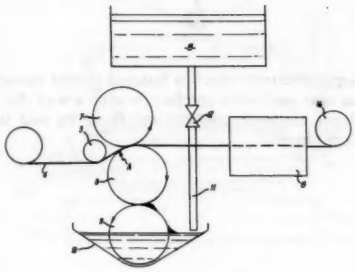
Peter S. Collishaw, and Michael Wilkinson, both of Nottingham, England, assignors to Caligen Foam Limited, Lancashire and W. E. Saxby (Nottingham) Limited, Nottingham, both of, England

Filed Nov. 16, 1981, Ser. No. 321,828

Claims priority, application United Kingdom, Mar. 15, 1980, 8008838; Mar. 4, 1981, 8106769

Int. Cl.³ B05C *1/00*; B05D *1/28, 3/02, 5/00*

U.S. Cl. 118—246 **15 Claims**



1. Apparatus for dispersing a substance in a thin flexible substrate of open-celled foam structure comprising means for continuously moving a sheet of the substrate, a pair of nip rollers between which the sheet is passed, one of which rollers serves as an applicator roller for transferring the substance to said substrate, and means for varying the length of the arc of contact between said substrate and said applicator roller.

4,503,802

DEVICE FOR UNIFORMLY APPLYING SMALL AMOUNTS OF FLUID TO MOVING WEBS

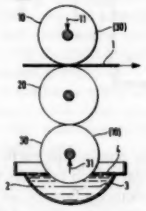
Walter Keller, Willich; Johannes Kutz, and Gerhard Severens, both of Tonisvorst, all of Fed. Rep. of Germany, assignors to Eduard Küsters, Krefeld, Fed. Rep. of Germany

Filed Feb. 15, 1983, Ser. No. 466,492

Claims priority, application Fed. Rep. of Germany, Feb. 19, 1982, 3205911

Int. Cl.³ B05C *1/08*

U.S. Cl. 118—249 **14 Claims**



1. In a device for uniformly applying small quantities of fluid to a moving web, said device comprising a contoured first roller and a pair of second rollers engaging said first roller at diametrically opposed sides thereof, said second rollers having elastic coverings, said web moving between said first roller and one of said second rollers at a nip formed thereby, the other of said second rollers serving to transfer fluid, the improvements wherein:

the first roller is provided with an elastic covering having a hardness of 80° to 90° Shore D;

the elastic covering of said first roller is provided with circumferential grooves having an axial center-to-center spacing of 0.3 to 1.5 mm and a depth 0.3 to 1.5 times as large as the center-to-center spacing; and

one of the second rollers is provided with circumferential incisions having a longitudinal spacing of 0.2 to 1 mm and a depth of 0.5 to 1.5 mm.

4,503,803

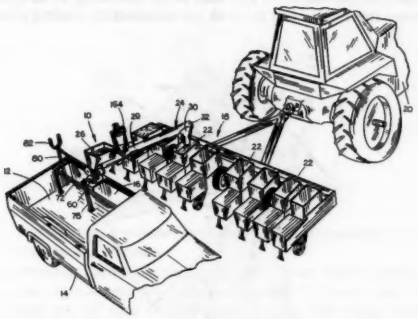
SEED TREATER AND CONVEYING APPARATUS

Ronald A. Barnes, 915 S. 218th St., Elkhorn, Nebr. 68022

Filed Mar. 8, 1984, Ser. No. 587,628

Int. Cl.³ B05C *3/08*

U.S. Cl. 118—303 **14 Claims**



1. An apparatus for simultaneously conveying seed and applying a powder chemical treatment to it, comprising, in combination,

an elongated auger tube having opposite inlet and discharge ends, seed supply means adjacent the inlet end thereof, an applicator opening through said tube at a position spaced upstream from said seed supply means and an auger rotatably supported therein, said auger comprising an elongated center shaft and brush flighting extending outwardly from said center shaft,

an applicator for depositing powder chemical treatment on the seed conveyed through the auger tube, said applicator comprising,

an upright tank having a discharge opening at the lower end thereof,

means for supporting said tank relative to said auger tube such that said discharge opening is in communication with said applicator opening,

adjustable closure means on said tank for selectively and adjustably closing and opening said discharge opening, and

a baffle situated within said discharge opening for blocking the passage of seed upwardly through said discharge opening, and

agitator means for agitating treatment contained in the applicator tank.

4,503,804

EDGE SEAL ASSEMBLY FOR PAPER COATING APPARATUS

Wayne A. Damrau, Wisconsin Rapids, Wis., assignor to Consolidated Papers, Inc., Wisconsin Rapids, Wis.

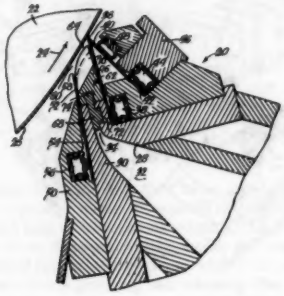
Filed Jan. 17, 1983, Ser. No. 458,490

Int. Cl.³ B05C *5/02*

U.S. Cl. 118—410 **13 Claims**

1. In an applicator for applying a coating liquid to a moving web of paper carried through an application zone, wherein the applicator is of the type comprising a body portion having a chamber therein with an elongate metering slot therefrom defined between upper ends of front and rear walls of said

body portion and extending substantially transversely across the web; a doctor blade extending from said rear wall substantially transversely across and against the web; an orifice plate extending from said front wall substantially transversely across and toward but spaced from the web to define a gap therewith; and means for introducing coating liquid under pressure into said chamber and through said metering slot into an application zone for application onto the web, an improved sealing means at each side end of said metering slot and application zone, said sealing means, doctor blade and orifice plate defining said application zone therebetween and above said metering slot, each said sealing means comprising edge seal means sealed along side surfaces thereof with said doctor blade and orifice plate, sealed along a lower surface thereof with said upper ends of said front and rear walls, extending at an upper surface thereof toward the web for substantially sealing there-



with and adjustably mounted for movement into and out of said application zone side end, and an elongate deckle within said metering slot, separate from and movable with respect to said edge seal means, adjustably extendable along and within said metering slot below said edge seal means a selected distance with respect to and inwardly of said edge seal means and substantially sealed with said body portion front and rear walls within and on opposite sides of said metering slot, said deckle closing said metering slot for said selected distance inwardly of said side end thereof to control the length of said metering slot so that said metering slot is open only inwardly of said edge seal means, whereby coating liquid is directed through said metering slot into said application zone only inwardly of said edge seal means and is not directly impinged onto said edge seal means as it exits said metering slot so that leakage of coating liquid past said edge seal means is reduced.

4,503,805

LIQUID DEVELOPER DEVICE

Klaus-Peter Schoen, Wiesbaden, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Aug. 31, 1983, Ser. No. 528,245

Claims priority, application Fed. Rep. of Germany, Sep. 6, 1982, 3233041

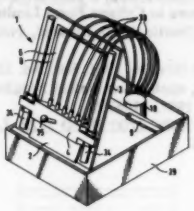
Int. Cl.³ G03G *15/06*

U.S. Cl. 118—649 **19 Claims**

1. A liquid developer device for a recording material carrying a latent electrostatic charge image, comprising:

a planar frame having an adjustable inclination relative to the horizontal;

developing means for bringing a layer of liquid developer into contact with said recording material, such that said latent electrostatic charge image is developed, said developing means comprising at least one conveying device which is arranged in said frame and which has an outlet aperture of predetermined size for supplying said liquid developer under pressure to said recording material, such that said layer of liquid developer has a thickness which is determined by the size of said outlet aperture and said pressure, respectively; and



a developer electrode which is fastened to said conveying device near said outlet aperture, in such a way that said developer electrode contacts and floats on said liquid developer layer.

4,503,806

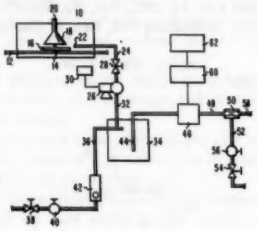
LUBRICANT DETECTOR AND MEASURING DEVICE

John J. Prusak, Pike Township, Marion County, Ind.; Brian E. Lock, Princeton Borough, N.J., and Joseph H. Thorn, Indianapolis, Ind., assignors to RCA Corporation, New York, N.Y.

Filed Feb. 3, 1984, Ser. No. 576,716

Int. Cl.³ B05B *12/08*

U.S. Cl. 118—712 **4 Claims**



1. In an apparatus for coating the surface of an article with a film of a liquid material which includes a chamber, a nozzle in said chamber for directing a flow of air containing particles of said liquid material onto the surface of the article and means for providing a flow of air containing said particles to the nozzle, the improvement comprising:

a tube in said housing having one end adjacent said nozzle,

a pump having its inlet end connected to the other end of said tube for removing from the housing a portion of the air containing the particles,

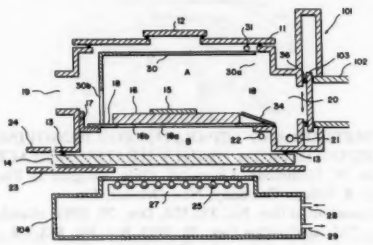
means for diluting the air containing the particles with additional air, said means being connected to the outlet end of the pump, and

means for counting the number of particles in the diluted mixture of air and particles.

4,503,807
CHEMICAL VAPOR DEPOSITION APPARATUS

Satoshi Nakayama; Hideaki Takeuchi; Junichi Murota, all of Isehara; Tatuhiko Hurukado, Hachioji; Shigeru Takeda, Hamura; Masuo Suzuki, Fussa; Harushige Kurokawa, Higashimurayama, and Humihide Ikeda, Akishima, all of Japan, assignors to Nippon Telegraph & Telephone Public Corporation, Tokyo, Japan

Filed May 29, 1984, Ser. No. 614,783
Claims priority, application Japan, Jun. 1, 1983, 58-95748
Int. Cl.[3] C23C *13/10*
U.S. Cl. 118—719 10 Claims



1. A chemical vapor deposition apparatus for depositing a film on a wafer comprising:

(a) a reactor having an opening through which said wafer is charged into and discharged from said reactor, an exhaust port and a transparent portion forming at least a part of a wall of said reactor;

(b) a susceptor disposed within said reactor, said susceptor having one surface disposed in opposed relationship with said transparent portion of said reactor and an opposing surface for supporting at least one wafer thereon, the space between said one surface of said susceptor and said transparent portion comprising a purging space;

(c) a partition for dividing said reactor into a reaction space and said purging space, said susceptor being supported on said partition within said reaction space;

(d) means for introducing a reaction gas into said reaction space;

(e) means for introducing a purging gas into said purging space;

(f) a lamp unit disposed outside of said transparent portion of said reactor for heating said susceptor;

(g) a first exhaust unit coupled to said exhaust port of said reactor for decreasing the pressure in said reactor;

(h) a loading chamber coupled through a first gate to said wafer charging and discharging opening of said reactor;

(i) a second exhaust unit coupled to said loading chamber for reducing the pressure therein;

(j) a second gate for loading a wafer into said loading chamber and unloading a wafer from said loading chamber;

(k) a plurality of wafer mounting portions provided within said loading chamber; and

(l) means for transporting said wafer between said susceptor in said reactor and said plurality of wafer mounting portions within said loading chamber.

4,503,808
ANIMAL HERD MANAGEMENT SYSTEM

George A. McAlister, 7922 Windmill Hill, San Antonio, Tex. 78229

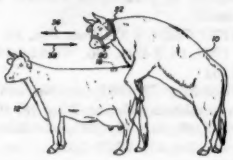
Filed Jun. 6, 1983, Ser. No. 501,181
Int. Cl.[3] A01K *29/00*
U.S. Cl. 119—1 1 Claim

1. A system for detecting standing heat of a first animal comprising:

generator means adapted to be implanted in the body of the first animal for generating an identification signal uniquely identifying the first animal and for generating time of day signals;

sensor means adapted to be secured to the body of a second animal for receiving said identification signal and a first time of day signal generated by said generator means as the second animal mounts the first animal and for receiving said identification signal and a second time of day signal, subsequent to said first time of day signal generated by said generator means as the second animal dismounts the first animal in which no contact occurs between said generator means and said sensor means;

said sensor means further including means for transmitting said signals received from said generator means and for



transmitting a unique identification signal associated with the second animal;

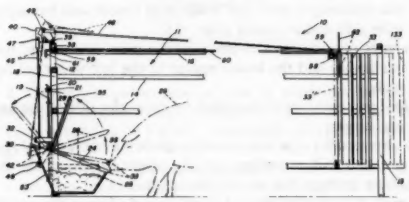
processing means for receiving said sensor means transmitted signals and for determining the difference between said second time of day signal and said first time of day signal thereby determining the length of time the second animal was in mounting contact with the first animal and for identifying the first animal; and

means interconnected to said processing means for recording the length of time the second animal was in mounting contact with the first animal determined by said processing means and for recording the identity of the first and second animals.

4,503,809
SOW-OPERATED FEED STALL

Nathan L. Watkins, Sr., Rte. 3, Box 24A, Linden, Tenn. 37096

Filed Aug. 12, 1983, Ser. No. 522,515
Int. Cl.[3] A01K *29/00*
U.S. Cl. 119—27 7 Claims



1. A feed stall for an animal comprising:

(a) an elongated enclosure frame large enough to receive a single animal therein, said enclosure frame having side walls, a front end and a rear opening to permit entry to and exit from the enclosure frame by the animal,

(b) a gate pivotally mounted on said enclosure frame for swinging movement to open and close said rear opening,

(c) a feed trough having an upper opening and mounted within said enclosure frame adjacent said front end,

(d) a lid mounted on said feed trough for movement between a closed position covering said upper opening, and an open position away from said upper opening to expose the contents of said feed trough for feeding,

(e) said lid in closed position having a portion adapted to be

engaged and raised by the nose of an animal within said enclosure frame to said open position, and

(f) link means operatively connecting said lid and said gate, whereby movement of said lid from its closed position to its open position actuates said link means to move said gate to close said rear opening, and movement of said gate to open said rear opening actuates said link means to move said lid from its open position to its closed position.

4,503,810

WATER HEATER

Kazuo Fujishita, Yamatokoriyama; Hideki Kaneko, Ikoma; Yoshiyuki Ushirokajitani, and Tadao Kanno, both of Nara, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

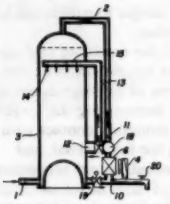
PCT No. PCT/JP82/00201, § 371 Date Jan. 24, 1983, § 102(e) Date Jan. 24, 1983, PCT Pub. No. WO82/04304, PCT Pub. Date Dec. 9, 1982

PCT Filed May 27, 1982, Ser. No. 465,870

Claims priority, application Japan, May 28, 1981, 56-82252; May 28, 1981, 56-82253; Jun. 18, 1981, 56-95034

Int. Cl.³ F22B 5/00

U.S. Cl. 122—13 R 2 Claims



1. A water heater comprising:

a hot water storage tank having a lower region, an upper region, and a lateral wall;

a cold water infeed pipe in the lower region of the hot water storage tank;

a hot water outfeed pipe in the upper region of the hot water storage tank;

a heat source located outside the hot water storage tank;

a burner arranged in the heat source;

a heat exchanger arranged in the heat source and having an inlet side and an outlet side;

an inlet pipe connected between the inlet side of the heat exchanger and the lower region of the hot water storage tank;

a first switching valve installed on the outlet side of the heat exchanger;

an upper outlet pipe connected to the first switching valve at one end and extending into the upper region of the hot water storage tank at its other end;

a spray pipe connected to the other end of the upper outlet pipe, said spray pipe being closed at its front end and having a plurality of small holes spaced along its length and directed downwardly, said spray pipe also having a bar-like or a ring-like cross-section;

a lower outlet pipe connected to the first switching valve at one end and extending into the lower region of the hot water storage tank at its other end; and

first and second temperature thermistors installed on the lateral wall of the hot water storage tank to turn on and off the burner to control the heating temperature for the hot water storage tank,

wherein the first temperature thermistor is disposed in the lower region of the hot water storage tank and the second temperature thermistor is disposed in the upper region of the hot water storage tank,

said lower and upper outlet pipes being associated with the first and second temperature thermistors, respectively,

wherein the first switching valve is controlled and switched to select either the upper outlet pipe or the lower outlet pipe for high temperature hot water to pass through, depending upon whether either a full load or a small quantity of hot water is needed, respectively.

4,503,811

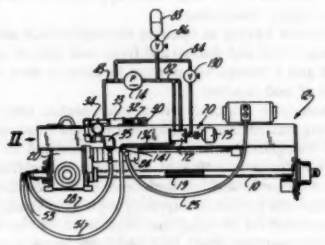
METHOD AND APPARATUS FOR REMOVING DEPOSITS FROM HIGHLY HEATED SURFACES

Charles W. Hammond, Lancaster, Ohio, assignor to The Babcock & Wilcox Company, New Orleans, La.

Continuation of Ser. No. 335,556, Dec. 29, 1981, abandoned. This application Oct. 20, 1983, Ser. No. 543,784

Int. Cl.³ F22B 37/52

U.S. Cl. 122—392 2 Claims

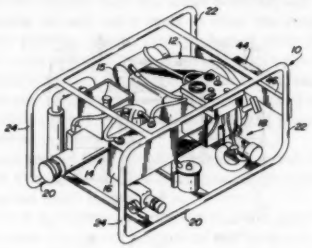


1. Means for dislodging an adherent highly heated slag-like deposit which is at a temperature above the boiling point of water from the heated area of a heat exchanger or the like, comprising a water lance having a plurality of isolated water passages extending longitudinally therethrough and having a portion including a free end, said portion being movable into and retractable from the heat exchanger, a plurality of nozzles carried by said portion of the lance in longitudinally spaced relation including a first nozzle connected to a first one of said passages and a second nozzle connected to a second one of said passages, said second nozzle being farther from the free end than the first nozzle, means for delivering an uninterrupted flow of water under pressure through said first one of said passages for projection in the form of a jet from the first nozzle, means for delivering a flow of water under pressure through said second one of said passages for projection in the form of a jet from the second nozzle, means for periodically interrupting the flow from said second nozzle to break the jet from said second nozzle into pulses which develop a higher peak impact pressure than the jet from the first nozzle, and means for moving the lance in a longitudinal pattern such that said nozzles successively trace a same predetermined path to form an area of fissures in the deposit, whereby portions of said deposit along said path are successively contacted first by the jet from said first nozzle and then by pulses from said second nozzle, and at a speed so related to the spacing of the nozzles, and to the rate of vaporization of the water, and to the temperature of the slag, that the pulses from the second nozzle strike the fissured area after the water has evaporated from the fissures but while fissures are still present in the deposit.

4,503,812
STARTING SYSTEM FOR A PORTABLE ENGINE-PUMP UNIT

H. Alfred Eberhardt, Paoli, Pa., assignor to Hale Fire Pump Company, Conshohocken, Pa.

Filed Mar. 15, 1982, Ser. No. 358,546
Int. Cl.³ F02B *63/06*; F02M *31/12*
U.S. Cl. 123—2 **13 Claims**



1. A light-weight manually portable engine-pump unit useable on board ships comprising

a manually portable pump,

an internal combusion engine,

an electrical starting system for said engine including a starter motor, a rechargeable storage battery and first electrical circuit means for supplying a charging current to said battery,

a manually portable carrying frame having said pump, said engine and said starting system mounted thereon,

a stationary holder for releasably receiving said carrying frame in a stored position, said frame being movable into and out of said stored position in said holder,

said first circuit means comprising an electrical contact means for said charging current positioned on said carrying frame for movement therewith,

and power supply means including second electrical circuit means for supplying electrical power to an electrical contact means on said holder,

said electrical contact means of said first circuit means being positioned to move into and out of electrical contact with said electrical contact means of said second circuit means when said carrying frame is moved into and out of said stored position on said holder, said first and second circuit means being constructed and arranged to supply a charging current to said battery when said carrying frame is in said stored position and to disconnect the supply of charging current when said carrying frame is moved out of said stored position.

4,503,813
ENGINE COMBUSTION CONTROL SYSTEM AND METHOD EMPLOYING CONDENSATION OF SOME EXHAUST GAS

John E. Lindberg, Point Richmond, Calif., assignor to Combustion Control Developments Ltd., Berkeley, Calif.

Filed Jul. 7, 1983, Ser. No. 511,524
Int. Cl.³ F02M *25/06*
U.S. Cl. 123—25 E **49 Claims**

1. In an internal combustion engine employing water in the combustion process and having a combustion chamber with an intake manifold and an exhaust conduit, the combination of

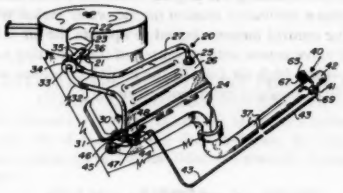
condensing means for condensing liquid from the engine exhaust gases and having scoop means perpendicular to the flow of exhaust gas for picking up a portion of the exhaust gas at the total pressure of said gas,

liquid conducting means employing said total pressure for forcing and for conducting such condensed liquid to said intake manifold, and

means for mixing atmospheric air with said liquid before supplying it to said intake manifold.

38. A method of operating an internal combustion engine employing water in the combustion process and having an intake manifold, including the steps of

condensing liquid from a portion of the engine exhaust gases while taking off the total pressure of said exhaust gases,



conducting such condensed liquid to said intake manifold of the engine for use there, said conducting employing said total pressure as an impelling force,

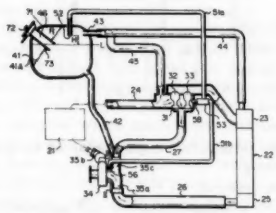
mixing atmospheric air with said condensed liquid, and

introducing the resultant mixture into said intake manifold.

4,503,814
SYSTEM FOR PREVENTING CAVITATION IN WATER-COOLED INTERNAL COMBUSTION ENGINE

Hidefumi Fujihara, Ageo; Hiroshi Okazoe, Tokyo, and Yoichi Hashimoto, Ageo, all of Japan, assignors to Nissan Diesel Motor Company, Limited, Japan

Filed Dec. 21, 1983, Ser. No. 563,970
Claims priority, application Japan, May 12, 1983, 58/69784[U]; May 12, 1983, 58/69785[U]; May 12, 1983, 58/69786[U]
Int. Cl.³ F01P *5/10*
U.S. Cl. 123—41.3 **16 Claims**



1. Cavitation prevention system in water-cooled internal combustion engine particularly for suppression of cavitation erosion occurring on a water jacket wall, said system comprising;

a cooling water circulating passageway for circulating said cooling water between the water jacket of the engine and a radiator to transfer a heat generated in the engine to the radiator by means of said cooling water and thereby to radiate the heat therein;

a water pump mounted in the cooling water circulating passageway to supply the cooling water forcibly under a pressure;

means for storing air having an inlet passageway and an outlet passageway both in communication with the cooling water circulating passageway, said air storing means being disposed above the cooling water circulating passageway and having at its upper portion a space for storing air to be introduced into the cooling water in the cooling water circulating passageway;

air metering means for regulating an amount of air to be supplied to the cooling water circulating passageway and which is provided in the air storing means;

an air introducing passageway communicating the air storing space of the air storing means with the air sucking side of the water pump to lead the air from the air storing means into the cooling water to be mixed therewith by means of a suction pressure of the pump;

air flow control valve means mounted in the air introducing passageway;

means for detecting the engine condition which is likely to produce cavitation erosion on the water jacket wall; and valve control means adapted to operate the air flow control valve means with an output of the detecting means to provide a high air flow at the engine condition which is likely to produce cavitation erosion.

4,503,815

STRATIFIED CHARGE VARIABLE COMPRESSION RATIO ENGINE

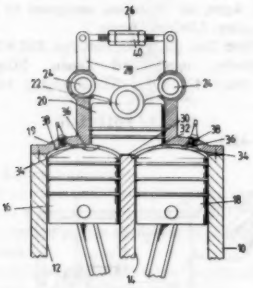
Ronald M. Amm, 197 N. Ridge Rd., Durban, Natal, South Africa 4001

Filed Jun. 1, 1982, Ser. No. 383,939

Claims priority, application United Kingdom, Jun. 2, 1981, 8116915

Int. Cl.³ F02B *75/00*

U.S. Cl. 123—48 A **8 Claims**



1. An internal combustion engine, adapted to ignite gases therein, comprising:

(a) at least two pistons;

(b) at least two adjacent cylinders, each adapted to receive gases, one of said pistons being positioned in each of said cylinders wherein said pistons are adapted to reciprocate in unison in the same direction in said adjacent cylinders; and

(c) a chamber straddling said adjacent cylinders and comprising a closure member biased into a seated position in which said cylinders are isolated from each other, and wherein said closure member is adapted to move from said seated position to an unseated position in which said cylinders communicate with one another, in response to a predetermined pressure of gases in said cylinders after ignition of said gases, wherein said pistons comprise means for moving all of said gases in said two cylinders into said chamber to continue combustion after ignition when said pistons reach their maximum extension toward said chamber, and wherein said pistons move away from said chamber in response to a predetermined pressure of combusting gases in said chamber, wherein said engine further comprises a biasing means for moving said closure member into its seated position during said movement of said pistons away from said chamber, thereby expelling all of said combusting gases into said cylinders.

4,503,816

COMBUSTION ENGINE WITH A CONSTANT COMBUSTION VOLUME

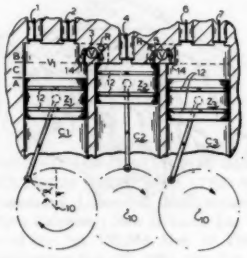
Peter H. Gijbels, Spoorwegstraat 8, 3590 Hamont-Achel, and Jozef M. Gijbels, Tramlaan 148, 1960 Sterrebeek, both of Belgium

Filed May 23, 1983, Ser. No. 497,258

Claims priority, application Belgium, May 28, 1982, 893338

Int. Cl.³ F02B *25/12*

U.S. Cl. 123—53 AA **5 Claims**



1. A reciprocating combustion engine comprising:

(a) a first cylinder wherein combustion takes place including a piston, intake and exhaust valve means, a fixed combustion chamber defining a combustion volume of said first cylinder and about one-half a total volume of combustion gases, and fuel injection and ignition means;

(b) a second cylinder having a displacement equal to said first cylinder including a piston and exhaust valve means;

(c) valve means interconnecting said first and second cylinders adapted to transfer one half of the combustion gases of said combustion in said first cylinder to said second cylinder during said combustion,

whereby the total combustion volume of said engine is double that of said first cylinder; and wherein pre-ignition in said first cylinder is between about 45° and 60° before top dead center at about 3000 revolutions per minute and increases with higher engine speed and said second cylinder is advanced in rotation from said first cylinder by about 45°.

4,503,817

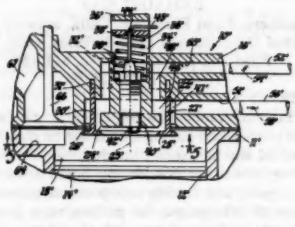
ANNULAR VALVE STRATIFIED CHARGE SPARK IGNITION ENGINES

Edward D. Klomp, Mt. Clemens, and Thomas P. Kosek, East Detroit, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Feb. 18, 1982, Ser. No. 349,848

Int. Cl.³ F01L *1/28*; F02P *13/00*

U.S. Cl. 123—79 R **9 Claims**



1. An internal combustion engine having in combination means defining a closed end cylinder having an axis with a piston reciprocable therein,

an annular port in said cylinder closed end having an axis substantially coincident with the cylinder axis and having concentric fixed annular valve seats at the inner and outer edges of said port,

a valve cooperatively associated with said port and having an annular head surrounding said inner edge valve seat and a tubular stem extending from the head and reciprocably supported in the cylinder closed end,

said stem extending through and dividing said port into separate annular inner and outer portions, said head being seatable on said valve seats to close the port inner and outer portions against communication with the cylinder and being movable away from said seats upon reciprocating movement of the stem to permit such communication, whereby actuation of said valve opens and closes communication of said cylinder with said port inner and outer portions in unison, and

first and second fluid supply means connected respectively with said port inner and outer annular portions to supply separate fluids thereof,

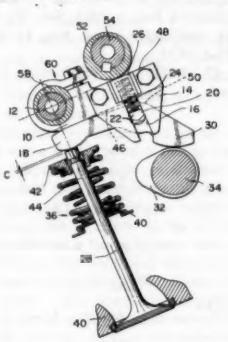
said head extending radially beyond the inner and outer extremes of adjacent portions of said stem and said port to deflect fluids entering the cylinder from the port inner and outer portions into flow patterns having radial components extending respectively inwardly and outwardly from the valve adjacent to the cylinder closed end so as to develop separate oppositely oriented inner and outer toroidal fluid patterns within the engine cylinder.

4,503,818

VARIABLE VALVE TIMING ARRANGEMENT FOR AN INTERNAL COMBUSTION ENGINE OR THE LIKE

Seinosuke Hara, Yokosuka, and Kazuyuki Miisho, Yokohama, both of Japan, assignors to Nissan Motor Company, Limited, Japan

Filed May 5, 1982, Ser. No. 375,472
Claims priority, application Japan, May 18, 1981, 56-74582
Int. Cl.³ F01L *1/10*
U.S. Cl. 123—90.16 **14 Claims**



1. A valve train for inducing reciprocative motion in a valve comprising:

a lever pivotally mounted at one end thereof;

a rocker arm engaging said lever to define a fulcrum point therebetween, said rocker arm engaging said valve at a first end thereof;

a mechanism guidingly interconnecting said rocker arm at a point intermediate of the ends thereof with said lever;

first means engaging one of a pair of elements comprising said lever and a second end of said rocker arm for inducing reciprocative motion therein; and

second means engaging the other of said pair of elements comprising said lever and said second end of said rocker arm for selectively controlling the angular position thereof

with respect to said valve;

wherein said mechanism comprises:

a shaft rotatbly disposed through said rocker arm;

means defining a guide slot in said lever for slidably receiving said rotatable shaft; and

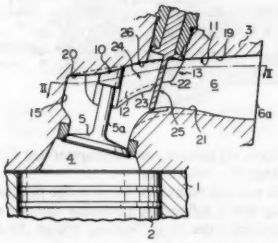
spring means for biasing said lever and said rocker arm apart.

4,503,819

HELICALLY-SHAPED INTAKE PORT OF AN INTERNAL-COMBUSTION ENGINE

Takeshi Okumura; Kiyoshi Nakanishi; Mutsumi Kanda; Takeshi Kotani, all of Susono, and Tokuta Inoue, Mishima, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed May 18, 1983, Ser. No. 495,589
Claims priority, application Japan, May 25, 1982, 57-87208
Int. Cl.³ F02F *1/42*
U.S. Cl. 123—188 M **22 Claims**



1. An intake device of an internal-combustion engine comprising:

an intake valve having a valve stem;

an axially extending intake port passage having an inlet opening at one end thereof and an outlet opening at the other end thereof, said intake port passage having a substantially cylindrically extending circumferential wall which circumferentially extends about said valve stem, a first side wall which extends between said inlet opening and said circumferential wall along an axis of said intake port passage, a second side wall which extends between said inlet opening and said circumferential wall along the axis of said intake port passage and is arranged so that it faces said first side wall, an upper wall which extends between said inlet opening and said circumferential wall along the axis of said intake port passage, and a bottom wall which extends between said inlet opening and said circumferential wall along the axis of said intake port passage;

a separating wall projecting downwardly from said upper wall and spaced from said bottom wall, said separating wall extending along the axis of said intake port passage and being spaced from said circumferential wall so as to define a helical portion having a helix-terminating portion between said separating wall and said circumferential wall, said separating wall being spaced from said first side wall so as to define therebetween an inlet passage portion tangentially connected to said helical portion, said separating wall being spaced from said second side wall so as to define therebetween a bypass passage which interconnects said inlet passage portion and said helix-terminating portion, said separating wall having an upstream end portion which is approximately centrally located between said first side wall and said second side wall in a cross-section along a line which is perpendicular to the axis of said intake port passage;

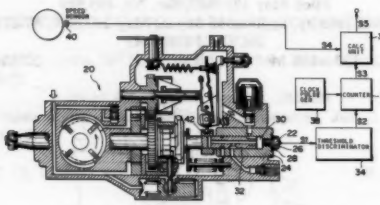
normally closed valve means arranged in said bypass passage for controlling the flow area of said bypass passage; and actuating means for actuating said valve means in response to the change in the operating condition of the engine to open said valve means when the engine is operating at a high speed under a heavy load.

4,503,820

FUEL INJECTION QUANTITY SENSING APPARATUS FOR AN INTERNAL COMBUSTION ENGINE

Toyoaki Nakagawa, Yokosuka, Japan, assignor to Nissan Motor Company, Limited, Kanagawa, Japan

Filed Oct. 25, 1982, Ser. No. 436,414
Claims priority, application Japan, Nov. 5, 1981, 56-176462
Int. Cl.³ F02D 1/04, 1/06
U.S. Cl. 123—357 **4 Claims**



1. A fuel injection quantity sensing apparatus for an internal combustion engine, comprising:

(a) pressure sensing means for sensing the pressure of fuel in a working space defined by a housing and one end of a fuel distributing plunger reciprocating within the housing;

(b) speed sensing means for sensing engine speed; and

(c) calculating means for calculating a fuel injection quantity in accordance with the sensed pressure and engine speed, said pressure sensing means comprising:

a piezoelectric member disposed in a working space defined by a housing and a fuel-distributing plunger reciprocating within the housing for transducing mechanical pressure to an electrical signal,

an electrically conductive member exposed to said working space and contacting a surface of said piezoelectric member for transmitting the pressure of fuel in said working space to said piezoelectric member,

an electrode contacting a surface of said piezoelectric member remote from the surface of said piezoelectric member contacting said electrically conductive member,

a hollow cylindrical member having a portion inserted into said housing and supporting said piezoelectric member, said electrically conductive member and said electrode, said electrically conductive member and said electrode being supplied in mutual electrical isolation.

4,503,821

APPARATUS AND METHOD FOR CONTROLLING AMOUNT OF FUEL INJECTED INTO ENGINE CYLINDERS

Masahiko Miyaki, Oobu; Toshimi Matsumura; Akira Masuda, both of Aichi; Sinya Sumitani, Kariya; Takashi Hasegawa, Tajimi, and Takahiro Hayakawa, Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Jan. 30, 1984, Ser. No. 575,385
Claims priority, application Japan, Jan. 31, 1983, 58-15306
Int. Cl.³ F02D 31/00
U.S. Cl. 123—357 **10 Claims**

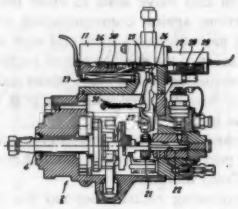
1. A method for controlling the amount of fuel injected into a multi-cylinder engine, comprising the steps of:

(a) detecting rotational speed of said engine at a plurality of predetermined angles of a crankshaft of said engine for producing a plurality of engine speed data whose number equals an integral multiple of the number of cylinders of said engine;

(b) determining either maximum or minimum engine speed data among said plurality of engine speed data;

(c) repeating the steps of detecting and determining a plurality of times which equals the number of said engine cylinders, for obtaining a plurality of sets of engine speed data;

(d) determining the order of said engine speed data showing



either maximum or minimum engine speed data within said plurality of engine speed data only when said order is common to majority of said plurality of sets of engine speed data;

(e) obtaining the difference between a maximum engine speed and a minimum engine speed for each set of engine speed data; and

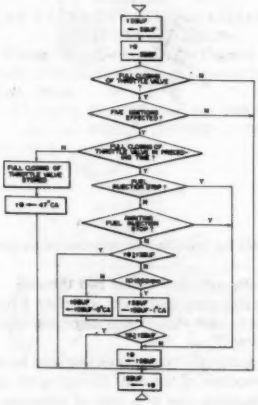
(f) controlling the amount of fuel injected into the engine cylinders so that the difference becomes common to all the cylinders.

4,503,822

ELECTRONIC ENGINE CONTROL SYSTEM

Nobuyuki Kobayashi, Toyota, and Hiroshi Ito, Nagoya, both of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Continuation of Ser. No. 407,557, Aug. 12, 1982, abandoned. This application Jun. 1, 1984, Ser. No. 616,778
Claims priority, application Japan, Aug. 13, 1981, 56-126881; Aug. 13, 1981, 56-126885
Int. Cl.³ F02B 3/00; F02P 5/06, 5/14
U.S. Cl. 123—416 **14 Claims**



1. An electronic engine control system with a fuel injector and an igniter for controlling the ignition timing of an engine, comprising:

throttle valve opening detecting means for detecting the opening of a throttle valve of the engine and outputting a throttle position signal; and

control means for outputting a signal to control the ignition timing to a maximum ignition advance angle when the full closing of said throttle valve is indicated by said throttle position signal, said maximum ignition advance angle being a fixed and predetermined timing determined in accordance with the particular engine used, but more advanced than the most advanced ignition timing which can occur within said particular engine when said throttle valve has not fully closed.

4,503,823

IGNITION TIMING CONTROL APPARATUS FOR INTERNAL COMBUSTION ENGINE

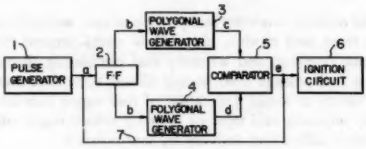
Suetaro Shibukawa, and Hiroshi Katada, both of Katsuta, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 15, 1982, Ser. No. 418,255

Claims priority, application Japan, Sep. 18, 1981, 56-146135

Int. Cl.³ F02P 5/04

U.S. Cl. 123—418 **5 Claims**



1. An ignition timing control apparatus for use in an internal combustion engine comprising:

pulse generating means which operates in synchronization with the rotation of the crank shaft of the engine for providing a first pulse at a point of time corresponding to a maximum advance angle of said engine and a second pulse at a point of time corresponding to a minimum advance angle of said engine;

a bistable circuit connected to said pulse generating means for producing an output having a transition from a first state to a second state in response to said first pulse and a transition from said second state to said first state in response to said second pulse;

first polygonal wave generating means for providing a first polygonal wave signal in response to the output of said bistable circuit, said first polygonal wave signal being at a first level when said bistable circuit is in said first state, falling to a second level when said bistable circuit makes a transition from the first state to the second state, sloping down thereafter in a first gradient with respect to time, and returning to the first level when said bistable circuit makes a transition from the second state to the first state;

second polygonal wave generating means for providing a second polygonal wave signal in response to the output of said bistable circuit, said second polygonal wave signal sloping up from a fourth level in a second gradient with respect to time after said bistable circuit has made a transition from the second state to the first state, maintaining a present level when said bistable circuit is in the second state, and falling to the fourth level when said bistable circuit makes a transition from the second state to the first state;

a comparison circuit which compares the levels of said first and second polygonal wave signals and provides an ignition pulse when the level of said second polygonal wave signal reaches the level of said first polygonal wave signal; and

an ignition circuit which operates to perform a spark discharge in response to said second pulse from said pulse generating means or said ignition pulse from said comparison circuit, whereby the advance angle of said engine is substantially constant at said maximum advance angle while said engine runs in a speed range between a first predetermined engine speed and a second predetermined engine speed which is higher than said first engine speed, the advance angle decreases in proportion to the increasing engine speed while said engine runs is a speed range between said second engine speed and a third predetermined engine speed which is higher than said second engine speed, and the advance angle runs at a speed higher than said third engine speed.

4,503,824

METHOD AND APPARATUS FOR CONTROLLING AIR-FUEL RATIO IN AN INTERNAL COMBUSTION ENGINE

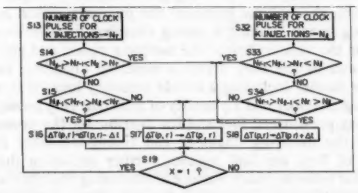
Masakazu Ninomiya; Atsushi Suzuki, both of Kariya, and Yutaka Kawashima, Okazaki, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Continuation of Ser. No. 298,735, Sep. 2, 1981,. This application Feb. 3, 1984, Ser. No. 576,773

Claims priority, application Japan, Sep. 5, 1980, 55-122245

Int. Cl.³ F02B 3/00; F02P 5/04

U.S. Cl. 123—436 **15 Claims**



1. A method for controlling the air-fuel ratio in an internal combustion engine, which comprises the steps of:

obtaining the base air-fuel ratio determined by a base fuel amount and a base intake air amount,

detecting the signal which represents the rotation rate of the engine in operation,

selecting the air-fuel ratio at the richer side of the base air-fuel ratio and the air-fuel ratio at the leaner side of the base air-fuel ratio in the vicinity of the base air-fuel ratio, by regulating the rate of the air flow in a by-pass for the main air path in the engine, said air flow in said by-pass being supplied to the downstream of a throttle valve,

driving the engine using an air-fuel mixture with said selected at least two air-fuel ratios in the richer and the leaner side during predetermined periods,

detecting the signals which represent the engine status while the engine is running with the richer side air-fuel ratio and the engine status while the engine is running with the leaner side air-fuel ratio,

storing the detected signals which represent the engine statuses,

comparing four signals representing four engine statuses detected during four running periods including two running periods with the richer side air-fuel ratio and two running periods with the leaner side air-fuel ratio,

determining, based on the result of said comparison, whether the air-fuel ratio is the value in the richer or the leaner side of the air-fuel ratio corresponding to the maximum specific fuel consumption, and

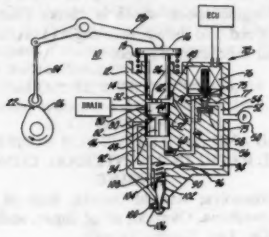
correcting the base air-fuel ratio by changing the base fuel injection amount, based on the result of said determination, so as to become closer to the air-fuel ratio corresponding to the best specific fuel consumption.

4,503,825

DIESEL FUEL SYSTEM

Michael J. Schneider, Birmingham, Mich., assignor to Bendix Corporation, Southfield, Mich.

Filed Apr. 2, 1982, Ser. No. 364,812
Int. Cl.³ F02M 39/00
U.S. Cl. 123—446 **7 Claims**



1. In combination a cam driven fuel injector of the type employing a pressure-time method of metering fuel to a metering chamber and cam means for causing the fuel injector to periodically inject quantities of fuel therefrom, the fuel injector of the type having a reciprocal pumping piston situated within a bore and a reciprocal metering piston similarly lodged within said bore, the volume between the pumping piston and the metering piston forming a timing chamber therebetween and wherein the volume below the metering piston and above the lower end of the bore forms a metering chamber; the fuel injector further including a nozzle remotely located from said metering chamber and a plurality of fluid carrying passages for receiving pressurized fuel and for distributing the pressurized fuel to the metering chamber and timing chamber from a source of fuel; the fuel injector further including dumping means for relieving the presssure in the timing chamber and the metering chamber in correspondence with the motion of said metering piston the fuel injector further including electronically controlled valve means for closing off a fluid passage between the timing chamber and the supply during the interval of time that the pumping piston is moving downwardly therein establishing a hydraulic link between the metering piston and the timing piston and for permitting fuel to flow from the supply to said metering chamber through another one of the fuel passages having an adjustable orifice means during that portion of the injector operating cycle characterized by the retracting motion of the pumping piston, the improvement comprising wherein the cam means includes a means for delaying the retracting motion of the pumping piston during the period of the operating cycle where fuel is flowing into the metering chamber thereby urging the metering piston upwardly such that the pumping piston operates as a mechanical stop to prevent excessive upward motion of the metering piston.

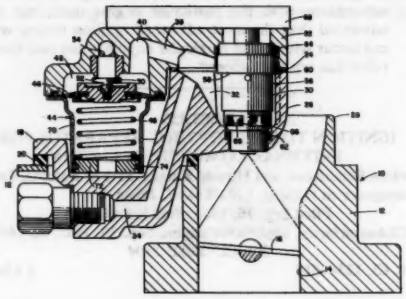
4,503,826

FUEL INJECTION APPARATUS

David R. Kessler, Churchville; David W. Beiswenger, Brockport, and Andrew J. Makusij, Fairport, all of N.Y., assignors to General Motors Corporation, Detroit, Mich.

Filed Apr. 22, 1981, Ser. No. 256,563
Int. Cl.³ F02M 51/02
U.S. Cl. 123—470 **3 Claims**

1. Apparatus for delivering fuel to an engine induction passage comprising an assembly having a fuel supply passage and an injector cavity receiving fuel from said supply passage, said assembly including a portion formed of heat conductive material and having an excess fuel passage also receiving fuel from said supply passage whereby fuel is circulated from said supply passage through said excess fuel passage, an electronically operable injector supported in said cavity, said injector having an opening receiving fuel from said cavity and being operable to deliver such fuel to said induction passage, and a heat generating electronic module adapted to operate said injector, and wherein said module is mounted in maximum heat transfer relation to said portion of said assembly adjacent said excess fuel passage whereby said portion of said assembly conducts heat away from said module to prevent excessive temperatures



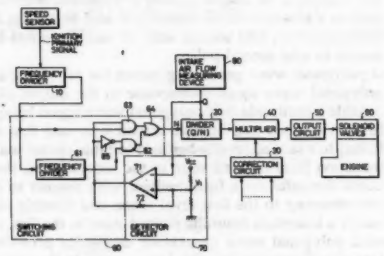
in said module, whereby said portion of said assembly conducts heat from said module along flow paths remote from said injector opening, and whereby fuel circulating through said excess fuel passage absorbs and directs such heat away from said cavity to avoid generation of fuel vapor bubbles in said cavity adjacent said injector opening which might otherwise adversely affect fuel delivery by said injector.

4,503,827

FUEL INJECTION SYSTEM FOR INTERNAL COMBUSTION ENGINE

Motoharu Sueishi, Toyota, and Mitsuo Nakamura, Kariya, both of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Oct. 20, 1981, Ser. No. 312,982
Claims priority, application Japan, Oct. 22, 1980, 55-148525
Int. Cl.³ F02D 5/02
U.S. Cl. 123—478 **2 Claims**



1. A fuel injection system for an internal combustion engine, comprising:

first means for detecting the rotational speed of the engine;

second means for detecting an intake air flow for the engine;

solenoid-operated fuel injection valves for supplying fuel to the engine; and

electronic control means responsive to signals delivered from said first and second means for causing all of said solenoid-operated fuel injection valves to be opened simultaneously for the same interval of time both above and below a predetermined value of the intake air flow, said electronic control means including means for computing the duration of pulses to be applied to said fuel injection valves in response to the signal from said second means

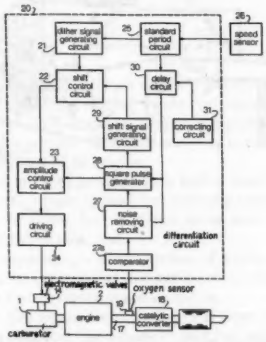
and means responsive to the signals from said first and second means for changing a number of occurrences per engine stroke of fuel injection so as to be smaller when said intake air flow is greater than said predetermined value than when said intake air flow is smaller than said predetermined value.

4,503,828

CONTROL SYSTEM

Masaaki Ohgami, Musashino, and Fujio Matsui, Mitaka, both of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 174,374, Aug. 1, 1980, Pat. No. 4,451,793. This application Apr. 9, 1984, Ser. No. 598,096
Claims priority, application Japan, Aug. 2, 1979, 54-98855
Int. Cl.[3] F02D *5/00;* **F02B** *3/08, 33/00;* **F02M** *7/00*
U.S. Cl. 123—489 **2 Claims**



1. An air-fuel ratio control system for an internal combustion engine having an intake passage, an exhaust passage, air-fuel mixture supply means, and electro-magnetic means for correcting the air-fuel ratio of the air-fuel mixture supplied by said air-fuel mixture supply means, the system comprising

dither signal generating circuit means for producing a periodical dither signal having a pattern which comprises a plurality of mountain portions and valley portions,

at least one of said mountain portions being lower than another of said mountain portions and at least one of said valley portions being shallower than the another of said valley portions,

a shift control circuit means for shifting the level of the center line of said dither signal,

driving circuit means for producing a driving output according to said dither signal for driving said electro-magnetic means,

detecting means for sensing the concentration of a constituent of the exhaust gases passing through said exhaust passage,

said detecting means including means for distinguishing the higher value than a reference value corresponding to the stoichiometric air-fuel ratio from the lower value with a steep changing,

judgement circuit menas for judging the shape of wave form of the output signal of said detecting means and comparing with said dither signal for detecting a portion removed from the dither signal for producing a judgement signal corresponding to the detected portion,

shift signal generating circuit means operative for producing a shift signal dependent on said judgement signal for adjusting said shift control circuit, and

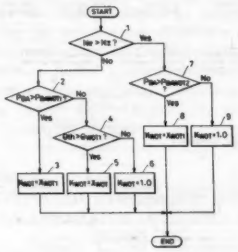
amplitude control circuit means for decreasing the amplitude of said dither signal when said judgement circuit produces a judgement signal having the same period as the dither signal.

4,503,829

FUEL SUPPLY CONTROL METHOD FOR INTERNAL COMBUSTION ENGINES UNDER HIGH LOAD CONDITIONS

Shumpei Hasegawa, Niiza, and Yutaka Otobe, Shiki, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 16, 1983, Ser. No. 552,485
Claims priority, application Japan, Nov. 19, 1982, 57-203292
Int. Cl.[3] F02B *3/00*
U.S. Cl. 123—492 **6 Claims**



1. A method of electronically controlling the quantity of fuel being supplied to an internal combustion engine having an intake passage, and a throttle valve arranged in said intake passage, in response to operating conditions of said engine, so as to achieve desired air-fuel ratios of a mixture being supplied to said engine, the method comprising the steps of: (a) detecting the rotational speed of said engine; (b) detecting absolute pressure in said intake passage of said engine at a zone downstream of said throttle valve therein; (c) detecting the valve opening of said throttle valve; (d) comparing a detected value of the rotational speed of said engine with a predetermined value; (e) comparing a detected value of said intake passage absolute pressure with a first predetermined valve and also comparing a detected value of said throttle valve opening with a predetermined value, when the detected value of the rotational speed of said engine is lower than said predetermined value thereof; (f) determining that said engine is operating in a first predetermined mixture-enriching region, when at least one of the detected values of said intake passage absolute pressure and said throttle valve opening is higher or larger than a corresponding one of said first predetermined value and said predetermined value thereof as results of the comparisons of the step (e); (g) comparing the detected value of said intake passage absolute pressure with a second predetermined value, when the detected value of the rotational speed of said engine is higher than said predetermined value thereof; (h) determining that said engine is operating in a second predetermined mixture-enriching region, when the determined value of said intake passage absolute pressure is higher than said second predetermined value thereof as a result of the comparison of the step (g); and (i) controlling the air-fuel ratio of said mixture to a predetermined value smaller than a stoichiometic mixture ratio, when it is determined in the step (f) or the step (h) that said engine is operating in a corresponding one of said first and second predetermined mixture-enriching regions.

4,503,830

APPARATUS FOR CONTROLLING FUEL INJECTION TIMING

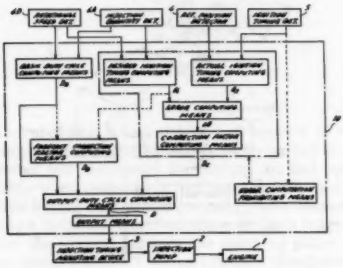
Tetsuya Nakamura, Kariya; Nobuhito Hobo, Inuyama; Yoshihiko Tsuzuki, Toyota; Yutaka Suzuki, Nishio; Satoshi Haseda, Kariya, and Akira Masuda, Aichi, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Feb. 21, 1984, Ser. No. 582,227

Claims priority, application Japan, Feb. 22, 1983, 58-28779; Apr. 12, 1983, 58-64951

Int. Cl.³ F02M *59/20*

U.S. Cl. 123—501 14 Claims



1. Apparatus for controlling fuel injection timing for use with a diesel engine, comprising:

(a) an engine rotational speed detector for producing a first signal indicative of the rotational speed of said engine;

(b) a fuel injection quantity detector for producing a second signal indicative of the quantity of fuel injected into cylinders of said engine;

(c) a reference position detector for producing a third signal indicative of a reference angle of a crankshaft of said engine;

(d) a fuel injection or ignition timing detector for producing a fourth signal indicative of the timing of fuel injection or ignition;

(e) a fuel injection pump equiped with a fuel injection timing adjusting device which is controlled by a drive signal having a variable duty cycle; and

(f) a computing means responsive to said first through fourth signals,

for calculating a basic duty cycle D_B for said drive signal by using said first and second signals;

for calculating a desired fuel injection or ignition timing θi by using said first and second signals;

for calculating an actual fuel injection or ignition timing θR by using said third and fourth signals;

for calculating the difference $\Delta\theta$ between said desired fuel injection or ignition timing θi and said actual fuel injection or ignition timing θR;

for calculating a correction factor Dc by using said difference $\Delta\theta$;

for calculating a forecast correction factor D_D by detecting the change in said basic duty cycle D_B or said desired fuel injection or ignition timing θi;

for correcting said basic duty cycle D_B by said correction factor D_C and said forecast correction factor D_D for obtaining an output duty cycle D; and

for outputting said drive signal having said output duty cycle D.

4,503,831

APPARATUS FOR AIR-INJECTION OF LIQUID GAS

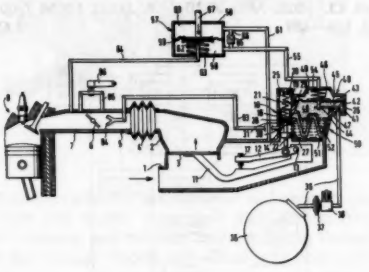
Rudolf C. Rijkeboer, Voorburg, Netherlands, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jan. 11, 1984, Ser. No. 569,882

Claims priority, application Fed. Rep. of Germany, Apr. 9, 1983, 3312758

Int. Cl.³ F02B *43/00*; F02M *21/04*

U.S. Cl. 123—525 7 Claims

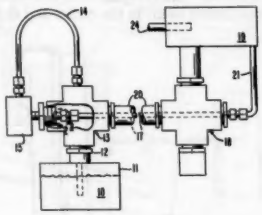


1. An apparatus for the air-injection of liquid gas into an intake tube of an internal combustion engine comprising a vaporizer pressure regulating valve, which has a yielding wall and a movable valve element, said movable valve element of the vaporizer pressure regulating valve being actuatable by said yielding wall which is engaged on one side by the pressure of the vaporized liquid gas and on the other side by a compression spring in a control chamber communicating with a control pressure line and the pressure of a control air regulated in the control pressure line by a control pressure regulating valve, at the movable valve element of which on one side the intake tube pressure upstream of an air flow rate meter measuring the air throughput in the intake tube upstream of a throttle valve prevails and a metering valve disposed downstream of the vaporizer pressure regulating valve, said movable valve element of said metering valve is embodied as a metering piston and actuated by the air flow rate meter, said movable valve element opens a metering cross section for the gaseous fuel to a greater or lesser extent toward the air-injection line leading to the intake tube and can be acted upon on one side by a restoring spring and the pressure of the vaporized liquid gas in the vaporizer pressure regulating valve and on the other side by the intake tube pressure upstream of the air flow rate meter and by the air flow rate meter, wherein the movable valve element of the control pressure regulating valve opens a valve seat disposed in a control pressure chamber communicating with the control pressure line to a greater or lesser extent, from which a negative-pressure line leads from a valve seat to the intake tube downstream of a throttle valve and the control pressure chamber includes therein a regulating spring which urges the movable valve element in the opening direction of the control pressure regulating valve toward a high-pressure chamber communicating via a high-pressure line with the intake tube upstream of the air flow rate meter wherein the high-pressure line and the control pressure line communicate via a throttle restriction.

4,503,832
LIQUID FUEL SYSTEM METHOD AND APPARATUS

Richard K. Pefley, and James B. Pullman, both of Santa Clara, Calif., assignors to Prodatek Corporation, Portola Valley, Calif.

Filed Feb. 2, 1982, Ser. No. 345,256
Int. Cl.³ F02B *43/00*
U.S. Cl. 123—527 **6 Claims**

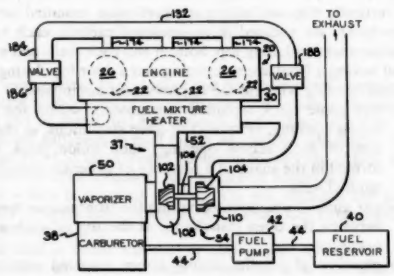


1. A liquid fuel system for an engine comprising:
a fuel tank means for storing vapor fuel under pressure in liquid phase with liquid and vapor in equilibrium,
a fuel delivery adapter means for securing in place along the inlet air stream of an engine,
a fuel line means for carrying vapor fuel in liquid phase from the fuel tank means to said fuel delivery means for direct injection of vapor fuel in liquid phase into the inlet air stream of the engine, and
means for vaporizing a small portion of vapor fuel to cool the vapor fuel in said fuel line and insuring direct injection of vapor fuel in liquid phase including
a pilot fuel line means for directing fuel from said fuel tank means or said fuel line means to said fuel adapter means,
said pilot fuel line means located within said main fuel line means for heat exchange between vaporizing fuel in said pilot fuel line means and vapor fuel in liquid phase in said fuel line means, and
throttling means for reducing the pressure on the fuel in said pilot fuel line means for allowing vaporization of fuel in said pilot fuel line means.

4,503,833
APPARATUS AND OPERATING METHOD FOR AN INTERNAL COMBUSTION ENGINE

Henry Yunick, Daytona Beach, Fla., assignor to MotorTech, Inc., Daytona Beach, Fla.

Continuation of Ser. No. 312,495, Oct. 19, 1981, abandoned. This application Jun. 22, 1984, Ser. No. 622,409
Int. Cl.³ F02M *31/00*
U.S. Cl. 125—545 **29 Claims**

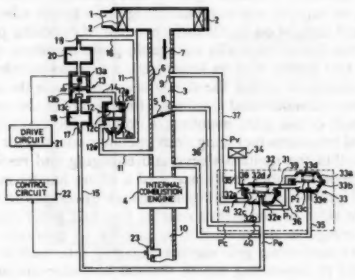


1. An electric ignition, internal combustion engine, comprising:
(a) a plurality of reciprocating pistons for imparting rotational forces to a crankshaft;
(b) a combustion chamber associated with each piston;
(c) structure defining a fuel mixture flow path including an inlet and extending into fluid communication with each combustion chamber through a valve controlled port;
(d) fuel mixture introducing means disposed near said inlet for introducing predetermined portions of air and a vaporizable fuel into said flow path;
(e) the structure including:
(i) a fuel mixture vaporizer for transferring heat absorbed by said engine coolant system to said fuel mixture;
(ii) a fuel mixture homogenizer disposed in said flow path intermediate said fuel mixture vaporizer and said combustion chamber, the homogenizer being driveable by a power source to compress and mix the mixture and maintain a pressure differential across the homogenizer, the homogenizer also being adapted to be heated by heat exhausted by the combustion chambers and including structure for transferring heat to the mixture; and,
(iii) a fuel mixture heater disposed intermediate said fuel mixture homogenizer and said combustion chambers for transferring further heat exhausted by said combustion chambers to said fuel mixture.

4,503,834
FEEDBACK CONTROL SYSTEM FOR SUPPLYING A FLUID TO AN APPARATUS OPERABLE WITH THE FLUID

Shumpei Hasegawa, Niiza, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 29, 1984, Ser. No. 584,566
Claims priority, application Japan, Mar. 18, 1983, 58-045777
Int. Cl.³ F02M *7/00*
U.S. Cl. 123—589 **7 Claims**



1. A feedback control system for controlling the amount of a fluid supplied to an apparatus operable with the fluid, whose operational state varies with the amount of the fluid supplied thereto, said amount of the fluid is controlled in accordance with a detected result of the operational state of the apparatus, comprising:
a detection means for detecting said operational state of the apparatus and producing a detection signal which can take a first level and a second level respectively indicative of first and second operational states of said apparatus;
a valve means disposed in a fluid passage connected to said appratus, for varying a sectional area of said fluid passage in accordance with a magnitude of a pressure of a fluid supplied to a pressure chamber thereof;
a first control pressure generating means for generating a first control pressure;
a second control pressure generating means for generating a second control pressure different from said first control pressure;
control means for supplying said first control pressure to

said pressure chamber via a first pressure passage when said detection signal is in the first level, and supplying said second control pressure to said pressure chamber via a second pressure passage when said detection signal is in the second level;

first and second orifices respectively provided in said first and second pressure passages; and

an accumulator provided in at least one of a part of said first pressure passage on the side of said pressure chamber from said orifice and a part of said second pressure passage on the side of said pressure chamber from said second orifice.

4,503,835

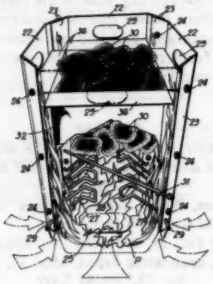
CHARCOAL BRIQUET LIGHTER

Wiley Williams, Rte. 2, Box 173, Auburn, Ala. 36830

Filed Dec. 27, 1983, Ser. No. 565,401

Int. Cl.³ A24C *1/16*

U.S. Cl. 126—25 B **11 Claims**



1. A charcoal briquette igniting and handling system comprising an exterior non-combustible ignition sleeve adapted to be placed upright on a grill surface, a pair of opposing parallel pivot axis freely vertically swingable grate members on and within said sleeve near its lower end, a support member and brace connected within the sleeve near and above the swingable grate members and forming a limit stop for the upward movement of the grate members, a combustible container for charcoal briquettes including draft openings adapted for placement within the ignition sleeve and engaging and resting on said support member and brace, and a lifting handle member for said ignition sleeve insertable through openings thereof on opposite sides of said sleeve near its top, said grate members being swingable downwardly by gravity to generally level briquette supporting grill surface engaging intermediate positions and to depending nearly vertical briquette discharging positions.

4,503,836

FIREPLACE AND STOVE APPARATUS

Jeffrey L. Evans, Aspen, Colo., assignor to Ting Enterprises, Inc., Aspen, Colo.

Division of Ser. No. 359,061, Mar. 17, 1982, Pat. No. 4,414,957. This application Sep. 20, 1982, Ser. No. 420,340

Int. Cl.³ F23L *5/02*

U.S. Cl. 126—135 **10 Claims**

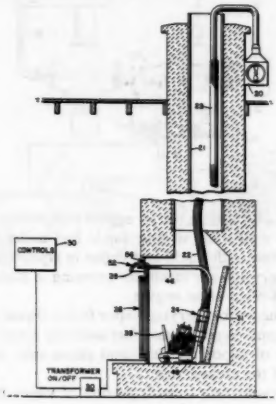
1. Blower control means for a solid fuel burning apparatus, comprising:

a thermostat for controlling a blower to move air heated by a solid fuel burning apparatus;

said thermostat comprising means for sensing room temperature, means for setting a desired room temperature, and means for directly relating the difference between the sensed room temperature and desired room temperature and accordingly increasing or decreasing blower speed for moving air first into a combustion chamber of the solid fuel burning apparatus and second into a room, adjacent the solid fuel burning apparatus, through an air outlet from the combustion chamber thereby maintaining a desired room temperature;

a first temperature sensor adjacent the air outlet from the combustion chamber of the solid fuel burning apparatus;

said first temperature sensor comprising means for sensing the temperature of air in the outlet as the air passes through the outlet from said combustion chamber into the room, means for setting a desired first temperature for air in the outlet, means for relating the difference between the sensed temperature of air in the outlet and the desired first



temperature for air in the outlet and accordingly controlling said blower at an increased speed when the sensed temperature of air in the outlet drops below said desired first temperature setting for air in the outlet, means for setting a desired second temperature for air in the outlet, means for relating the difference between the sensed temperature of air in the outlet and the desired second temperature and accordingly shutting off the blower when the sensed temperature of air in the outlet drops below said second temperature setting.

4,503,837

BAKING OVEN

Gilbert L. Smith, 3011 Ravine Way, Green Bay, Wis. 54301; David L. Swanson, 6718 Revere Ave., Wauwatosa, Wis. 53213, and Gilbert Trick, 888 St. Charles Dr., Green Bay, Wis. 54302

Filed Jan. 9, 1984, Ser. No. 569,284

Int. Cl.³ F23M *7/00*

U.S. Cl. 126—190 **4 Claims**

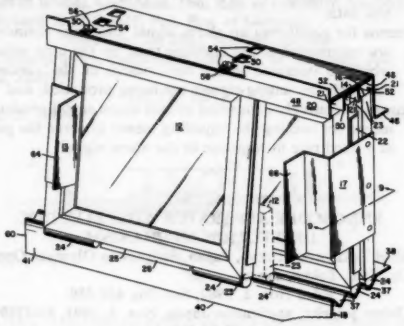
1. A commercial baking oven of the type in which a plurality of vertically disposed baking compartments, mounted between stanchions, are encased in an insulated cabinet, each baking compartment including top, bottom and back walls and a front wall having a front access opening and a door for closing such access opening wherein the improvement comprises:

lower guide track mounted immediately within the front access opening, between the oven stanchions, at the bottom of such access opening; such guide track being formed in the shape of a plurality of generally equidistant parallel vees;

upper guide track mounted within the front access opening, between the oven stanchions, at the top of such access opening;

a plurality of parallel sliding doors mounted within the upper guide track and lower guide track so as to open and close the access opening to the baking compartment, when slid from side to side, such doors having a top edge and a bottom edge;

door carrying runners mounted on the bottom of such doors, such runners being in the shape of cylinders of low friction material, such cylinders being mounted so the long axis of the cylinder is parallel to a line passing through the vee track, the cylinders supporting the doors riding in the track;



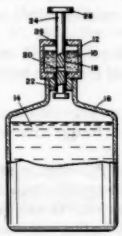
door guide shoes mounted on the top edge of such doors, such shoes being wider than the doors and slightly narrower than the door running space in the upper track; such guide shoes, and cylinder and vee mounting of the bottoms of the doors maintaining a generally uniform distance between the parallel doors measured across a plane passing between opposing doors and parallel to them.

4,503,838

LATENT HEAT STORAGE AND SUPPLY SYSTEM AND METHOD

Gustaf O. Arrhenius, La Jolla, Calif.; Michael L. Goldstein, Omaha, Nebr., and Candace X. Moore, San Diego, Calif., assignors to American Hospital Supply Corporation, Evanston, Ill.

Filed Sep. 15, 1982, Ser. No. 418,213
Int. Cl.³ F24J *1/00*
U.S. Cl. 126—263 **24 Claims**



13. Unitary latent heat storage and supply method comprising heating both a body of crystallizable phase change material (PCM) and an associated but separate body of nucleator to a temperature sufficient to melt the PCM, cooling said bodies to bring the PCM to supercooled condition for storage of heat as latent heat of crystallization, said nucleator comprising:

a salt which in solvated crystal form will nucleate and induce crystallization of said supercooled PCM from supercooled condition;

unsolvated or lower solvated crystals of said salt; and

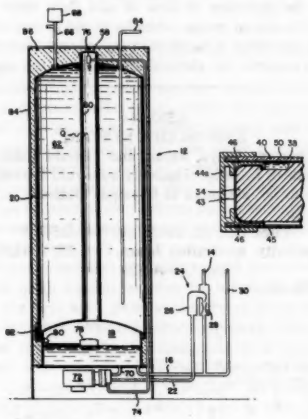
an amount of free and bound solvent less than that which would dissolve completely the existing unsolvated or lower solvated salt crystals and unsolvated or lower solvated salt crystals formed by desolvation of said solvated salt crystals at recharging temperature, whereby portions of unsolvated or lower solvated crystals not dissolved by said solvent at recharging temperature remain to induce crystallization in said body of nucleator after said bodies have been heated and cooled, introducing a controlled portion of said nucleator into said body of PCM to initiate crystallization of and supply of latent heat of crystallization from said body of PCM, reheating both of said bodies after crystallization of and delivery of heat from said body of PCM to remelt said PCM for storage of heat, said introduced portion of nucleator being soluble in the body of molten PCM during said reheating to the extent that the introduced portion of nucleator looses its nucleating ability, and cooling said bodies to bring the PCM to supercooled condition.

4,503,839

WATER PREHEATER SYSTEM

Phillip E. Dunstan, 1022 S. 208th St., Seattle, Wash. 98148

Filed Jun. 7, 1983, Ser. No. 501,794
Int. Cl.³ F24J *3/02*
U.S. Cl. 126—437 **33 Claims**



1. A water preheating system using solar energy, comprising:

(a) a heat transfer liquid;

(b) a negative-pressure solar collector in which the liquid is heated;

(c) a heat exchanger to exchange heat between the liquid and water; and

(d) plumbing means connecting the collector and exchanger to create a closed loop for circulation of the liquid within the plumbing means, collector, and exchanger, and including means for maintaining a negative pressure in the collector, the means for maintaining the pressure including an injector positioned near a mouth of a nozzle in a return line from the collector so that the liquid exiting the injector and entering the nozzle draws additional liquid in the return line from the collector through the nozzle and a pump in a supply line between the heat exchanger and the injector to force liquid from the heat exchanger through the injector.

4,503,840

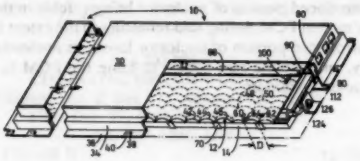
SOLAR ENERGY AND VENTING SYSTEMS

Burton Z. Chertok, Huntington Bay, N.Y., assignor to Burton Energy and Solar Technology Inc., North Babylon, N.Y.

Continuation-in-part of Ser. No. 288,299, Jul. 30, 1981, , and Ser. No. 366,861, Apr. 9, 1982,. This application Dec. 7, 1982, Ser. No. 447,612

Int. Cl.³ F24J *3/02*

U.S. Cl. 126—444 **22 Claims**



1. A solar system comprising input means for the supply of a fluid adapted for the absorbing of solar energy, output means for receiving and recirculating said fluid for purposes of heat exchange, solar-energy absorber means coupling said input means to said output means for the conveying of said fluid between the same, said absorber means being a thin-film flexible envelope, and support means to support said envelope at spaced positions between which corresponding lengths of the envelope are longer than the distances between the positions so as to enable the envelope to have a peristaltic-type flutter action in the direction of flow of said fluid from the input means to the output means whereby to aid in causing bubbles formed in said fluid to be flushed out of said absorber means thereby to improve the thermal efficiency of the same.

4,503,841

ENDOSCOPE SYSTEM

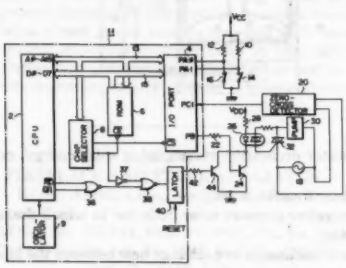
Takashi Tsukaya, Tokyo, Japan, and Takeshi Takamatsu, deceased, late of Hachioji, Japan (by Tokuyuki Takamatsu, legal representative), assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Oct. 21, 1982, Ser. No. 435,755

Claims priority, application Japan, Oct. 22, 1981, 56-168947

Int. Cl.³ A61B *1/00*

U.S. Cl. 128—4 **5 Claims**



1. An endoscope system comprising:

a memory for storing control data;

a chip selector operatively connected to said memory for applying a chip enabling signal to the memory to hold the memory in an enabling state in which the control data can be read out from the memory;

means for producing setting signals;

a processor operatively connected to said means for fetching the setting signals as instruction commands, operating the chip selector and reading out the control data from the memory in accordance with the setting signals when the memory is maintained in the enabling state by the chip selector;

a pump in said endoscope system for supplying fluid to a body cavity;

means operatively connected to the pump for adjusting power supplied to the pump in accordance with the control data;

means for producing an alarm signal while the memory is not maintained in the enabling state by the chip selector which is operated under the control of the processor although the setting signals are being produced; and

means operatively connected to said alarm signal producing means for causing the adjusting means to drive the pump at a fixed rate in response to the alarm signal.

4,503,842

ENDOSCOPE APPARATUS WITH ELECTRIC DEFLECTION MECHANISM

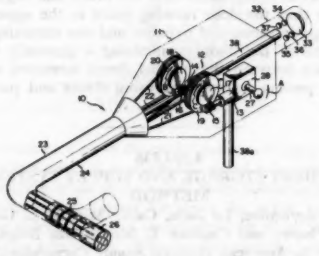
Syuichi Takayama, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Nov. 2, 1982, Ser. No. 438,459

Claims priority, application Japan, Nov. 4, 1981, 56-176917

Int. Cl.³ A61B *1/00*

U.S. Cl. 128—4 **13 Claims**



1. An endoscope apparatus comprising:

(a) an insertion section adapted to be deflective in a coeliac cavity of a living body into which said insertion section is inserted;

(b) a control section mechanically coupled to said insertion section;

(c) first motor means provided in said control section for generating rotational torque to bend said insertion section in a first direction;

(d) second motor means provided in said control section for generating rotational torque to bend said insertion section in a second direction;

(e) a deflection means, provided in said control section and said insertion section and mechanically coupled to a distal end of said insertion section and to said first and second motor means, for deflecting said insertion section in accordance with the rotational torques generated by said first and second motor means; and

(f) control circuit means including a single deflection control lever arranged in said control section and electrically connected to said first and second motor means for varying the amount of power to be supplied to said first and second motor means in accordance with manual inclination of said control lever by an operator and for selectively supplying power to said first motor means, said second motor means or to both said first and second motor means to drive said first and second motor means when said control lever is inclined in a predetermined direction, thereby allowing said distal end of said insertion section to directly deflect in an aimed direction, said deflection control lever being disposed to at least partially extend from said control section to the outside thereof and being

pivotally inclinable in any direction with respect to a neutral position thereof.

4,503,843

HYSTEROSCOPES

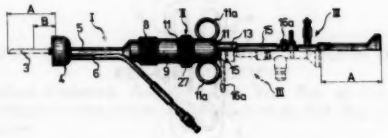
Manfred Boebel, Oetisheim, Fed. Rep. of Germany, assignor to Richard Wolf GmbH, Fed. Rep. of Germany

Filed Jan. 28, 1983, Ser. No. 462,003

Claims priority, application Fed. Rep. of Germany, Jan. 28, 1982, 3202693

Int. Cl.³ A61B *1/00*

U.S. Cl. 128—4 **8 Claims**



1. In a hysteroscope having an entrance adaptor being sealably attached to an entrance of a uterus by a negative pressure and having a passage to slidable receive a shaft having an optical system, said shaft being movable through the passage for insertion into the uterus through the cervical passage, the improvements comprising a guiding element having a distal end provided with means for securing the element to the adaptor and a proximal end having means for mounting the shaft with the shaft extending through the element and into the adaptor, said guide element comprising at least a first tube telescopical receiving a second tube, said tubes being movable from an elongated idle position with a majority of the second tube extending out of the first tube to a contracted position with a majority of the second tube being telescopically received in the first tube, handle means for moving the tubes to the contracted position, and spring means for biasing the tubes toward the idle position, the length of the guide element for the idle position being selected so that the distal end of the shaft is positioned adjacent an opening of the passage of the adaptor.

4,503,844

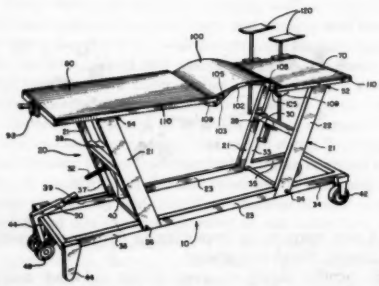
SURGICAL TABLE

Benard W. Siczek, La Grange Park, Ill., assignor to Fischer Imaging Corporation, Denver, Colo.

Filed Jan. 13, 1983, Ser. No. 457,644

Int. Cl.³ A61G *7/06*

U.S. Cl. 128—71 **14 Claims**



1. A surgical table comprising:

a base which defines first and second spaced supports;

a first table surface mounted to the first support;

a linear guide comprising a first guide member mounted to the second support, a second guide member guided for linear travel along the first guide member toward and away from the first table surface, and a coupling arrangement operative to adjust the linear position of the first guide member with respect to the second guide member, said second guide member defining a second table surface; and

a third X-ray transparent table surface interconnected between the first and second table surfaces, said third table surface being formed of a bendable material and having a convex shape, the curvature of which varies as a function of the linear position of the first guide member with respect to the second guide member.

4,503,845

APPARATUS FOR SUPPORTING A USER IN AN INVERTED POSITION

Anthony L. Licciardi, Boulder City, Nev., assignor to Back-Ease Products, Inc., Rochester, N.Y.

Filed Dec. 17, 1981, Ser. No. 331,613

Int. Cl.³ A61H *1/02*; A63B *1/02*

U.S. Cl. 128—75 **9 Claims**

1. Apparatus for supporting a user in an inverted position comprising:

a horizontal thigh support member supported above the floor a distance sufficient to enable the user to hang inverted with his thighs supported thereby, said thigh support member having at least one thigh support platform movable between a mounting position and a supporting position for permitting the user to maintain a fixed thigh position relative to the platform during mounting, use and dismounting of the apparatus thereby eliminating rubbing and discomfort;

a foot support member vertically spaced above and parallel to said thigh support member for bracing the feet of the user in a bent knee position thereby enabling the user to hang inverted without further support or restraint; and

first and second inclined members each having first and second ends extending generally from near the ends of said thigh support member to the floor for grasping by the user during mounting to enable a user to safely mount the apparatus unassisted.

4,503,846

DEROTATION LEG BRACE

Kelsey Martin, Azle, Tex., assignor to Medical Designs, Inc., Azle, Tex.

Filed Jul. 6, 1983, Ser. No. 511,265

Int. Cl.³ A61F *3/00*

U.S. Cl. 128—80 C **7 Claims**

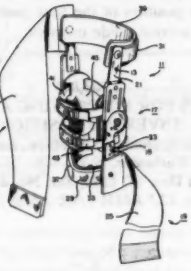
1. A knee brace for alleviating problems with tibia rotation and tibia desubluxation with respect to the femur of respective proximal and distal members of a wearer, comprising:

a. first and second pairs of elongate braces with each of said braces being relatively stiff so as to resist both torsion and bending forces; said first pair of braces being adapted to lie on opposite sides of the wearer's thigh and said second pair of braces being adapted to lie on opposite sides of the wearer's calf;

b. a pair of respective hinge means connected respectively with said first and second pairs of braces at their respec-

tive central ends for allowing controlling flexion and extension of the wearer's leg, and

c. means for adjustably placing and holding respective pairs of elongate braces desired attained positions on respective opposite sides of the wearer's thigh and calf with said hinge means positioned correctly adjacent the wearer's knee;



the improvement comprising:

d. an anterior cuff connected with said second pair of braces on opposite sides of the wearer's calf and having a flattened chord that is disposed so as to ride against the leg at the inside anterior of the tibia for preventing rotation of the tibia.

4,503,847

PROSTHETIC NAIL

William H. Mouradian, Santa Monica, Calif., assignor to Howmedica, Inc., New York, N.Y.

Filed Jan. 15, 1982, Ser. No. 339,513
Int. Cl.³ A61F 1/04, 5/04
U.S. Cl. 128—92 BC 23 Claims

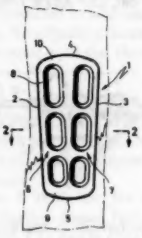
1. A prosthetic device for stabilizing fractures of a bone having an intramedullary canal which is not constant in cross-section along its length, comprising a continuous length of biocompatible metal having a first end portion terminating in an arcuate blunt ended configuration, a second end portion configured so as to be capable of being secured to the bone, and an elongated midportion positioned between said first and said second end portions, said midportion having a predetermined and preformed twisted configuration and together with said first end portion being configured and dimensioned for insertion into the intramedullary canal of the bone, said twisted configuration allowing for use in a bone having an intramedullary canal which is not constant in cross-section along its length so as to prevent rotational displacement of the nail.

4,503,848

OSTEOSYNTHESIS PLATE

Wolfhard Caspar, Bad Homburg, and Theodor Lutze, Dürbheim, both of Fed. Rep. of Germany, assignors to Aesculap-Werke Aktiengesellschaft, Tuttlingen, Fed. Rep. of Germany

Filed Mar. 25, 1982, Ser. No. 361,879
Claims priority, application Fed. Rep. of Germany, Apr. 8, 1981, 3114136
Int. Cl.³ A61F 5/04
U.S. Cl. 128—92 D 2 Claims



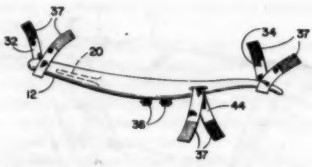
1. Osteosynthesis plate for mutually immobilizing several pieces of bone by means of screws that may be screwed into the pieces of bone through openings in the osteosynthesis plate that has longitudinal edges and is curved in the direction transverse to its longitudinal axes to form a concave inner surface adjacent said bone, said screws pressing the concave surface of the ostoesynthesis plate firmly against the pieces of bone, wherein the improvement comprises the longitudinal edges (2, 3) of the osteosynthesis plate (1) diverging in the manner of a trapezoid, and wherein said openings comprise two adjacent rows (6, 7) of elongated slots formed in said osteosynthesis plate to receive said screws, and the orientations of the longitudinal axes of the slots in the two rows (6, 7) diverging in the same direction as the diverging longitudinal edge of the plate the length of its slots increasing from the narrow end (9) of the osteosynthesis plate (1) to its wide end (10).

4,503,849

ARM RESTRAINT FOR BLOOD SAMPLING

William E. Morgan, and Patsy A. Morgan, both of 12012 Ringwood, Norwalk, Calif. 90650

Filed Sep. 16, 1982, Ser. No. 418,730
Int. Cl.³ A61M 5/00
U.S. Cl. 128—133 6 Claims



1. An arm restraint for immobilizing the arm of a patient while drawing blood comprising:

a rigid member having an upper, middle and lower portion;

a curved upper arm rigid member having a cross section shape designed to fit the back of a patient's upper arm and further comprising tourniquet attaching means in said upper arm rigid member and a snap on the backside of the end of said upper arm rigid member;

a middle arm rigid member having a concave cross section shape designed to fit a patient's elbow area and the back of a patient's forearm and further containing slots on each

side of said middle arm rigid member with a first holding strap fitted therethrough and further comprising means for attaching a tray to the back of said concave shape of said middle arm rigid member, and

a lower arm rigid member having a reverse curve from said upper arm rigid member and further having a concave cross section shape designed to fit a patient's wrist area and further containing a snap on the backside of the end of said lower arm rigid member.

4,503,850

COLD PROTECTION SUIT HAVING A PROTECTIVE BREATHING DEVICE

Adalbert Pasternak, Bad Schwartau, Fed. Rep. of Germany, assignor to Drägerwerk Aktiengesellschaft, Fed. Rep. of Germany

Filed Jan. 13, 1984, Ser. No. 570,494

Claims priority, application Fed. Rep. of Germany, Jan. 22, 1983, 3302114

Int. Cl.³ A62B 7/10

U.S. Cl. 128—201.25 **13 Claims**

1. A cold protection suit for a person, comprising a suit casing for substantially covering a person's body, arms and legs, and having an opening at least for the persons's face, said suit casing having an inner body casing wall, an outer casing wall spaced outwardly of said inner body casing wall leaving a flow space therebetween, wall means extending throughout a major portion of said suit casing between said inner body casing wall and said outer casing wall defining a chemical chamber therebetween, an inlet flow chamber on one side of said chemical chamber wall bounded by said chemical chamber wall and said outer casing wall and an outlet flow chamber on the opposite side of said chemical chamber bounded by said chemical chamber wall and said inner casing wall, and means passage connecting said inlet flow chamber to said chemical chamber and said chemical chamber to said outlet flow chamber, a face mask engageable over at least a nose and mouth of the person's face, having an exhalation tube connected into said inlet flow chamber of said suit casing, a separate exhaust tube connected to said outlet flow chamber, and a shield connected at its periphery to said suit casing about said opening and extending downward over said opening and the front of said suit casing to define a space between a front of said suit casing below said opening and said shield, said shield defining a downward exhaust discharge, said separate exhaust tube being connected into the space between said shield and the front of said suit casing.

4,503,851

DISPOSABLE FACE MASK WITH ODOR MASKING ATTACHMENT

Klaus Braunroth, 545-C 12th Ave., Hickory, N.C. 28601

Filed Aug. 5, 1983, Ser. No. 520,604

Int. Cl.³ A62B 7/00

U.S. Cl. 128—203.29 **3 Claims**

1. In a disposable, gas-permeable mask of the type adapted to be fitted over the nose and mouth of the wearer and held in place by a strand around the head, the improvement which comprises odor-masking means adopted to be activated when the mask is placed into use, and including:

(a) an envelope which is impervious to volatile substances and having at least one aperture on a face thereof, said envelope being secured to the mask proximate to the position of the mouth and nose;

(b) a supply of volatile odor-masking substance contained within said envelope;

(c) a seal releasably positioned over said aperture to prevent dissipation of the odor-masking substance until the mask is ready for use and the seal is removed;

(d) releasing means cooperating with said seal for removing said seal to permit evaporation of the odor-masking substance as the wearer breathes through the face mask and air is moved into the mask past the aperture and the envelope containing the odor-masking substance.

4,503,852

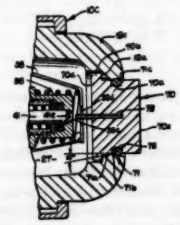
PILOT CONTROLLED REGULATOR SECOND STAGE

Tony Christianson, P.O. Box 3700, Manhattan Beach, Calif. 90266

Division of Ser. No. 295,535, Aug. 24, 1981, Pat. No. 4,386,624, which is a division of Ser. No. 84,421, Oct. 12, 1979, Pat. No. 4,297,998. This application Apr. 27, 1983, Ser. No. 489,052

Int. Cl.³ A62B 7/04

U.S. Cl. 128—204.26 **5 Claims**



1. In a scuba regulator second stage of the type having an outer housing, a mouthpiece, an inlet for connection of a source of breathable gas, flow control valve means within said outer housing for controlling the flow of breathable gas from said inlet to said mouthpiece in response to sensed inhalation pressure and wherein said valve means includes a control member translationally mounted in said housing with respect to said valve means such that when said member is in a first position, said valve is closed and when said member is in a

second position, said valve means is open, a device for preventing inadvertent turn-on valve means during unattended use of said regulator second stage comprising:

an opening in said housing in alignment with the translational axis of said control member, a button moveably mounted in said opening for limited inward and outward movement and aligned with said control member of said flow control valve means, said button having a projecting member extending toward said valve control member, and

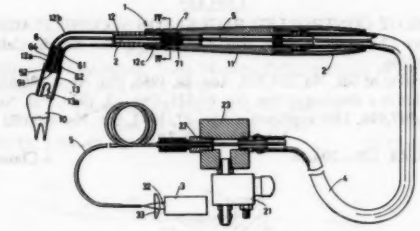
mechanically bistable mounting means, cooperatively engaging said button and said outer housing, for alternatively maintaining said button at one of two mechanically stable positions with respect to said outer housing, namely a first "disengaged" position in which said projecting member is spaced away from said valve control member allowing said control member to move from its first to its second position to permit unimpeded operation of said flow control valve, and a second "engaged" position in which said button is situated inward of said first "disengaged" position with said projection member so engaging said valve control member restraining it from moving to its second position, to impede the normal opening of said flow control valve means and for releasing said button from said second "engaged" position in response to an opposing force applied by the valve control member when said force is in excess of a predetermined minimum force corresponding to a predetermined minimum sensed inhalation pressure.

4,503,853

CONTRA ANGLE HANDPIECE FOR DENTAL TREATMENT BY LASER BEAMS

Sadayasu Ota, Kyoto, and Shinichi Nishimoto, Otsu, both of Japan, assignors to Kabushiki Kaisha Morita Seisakusho, Kyoto, Japan

Filed Aug. 31, 1982, Ser. No. 413,262
Claims priority, application Japan, Sep. 4, 1981, 56-132353[U]
Int. Cl.³ G02B *5/14*
U.S. Cl. 128—303.1 **3 Claims**



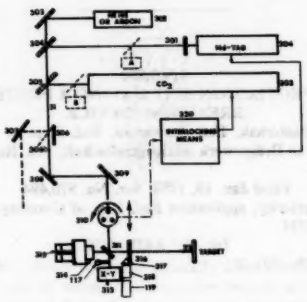
1. A contra angle handpiece for dental treatment by laser beams comprising a grip unit (11) and a contra angle applicator (12) detachably connected to said grip unit (11), said grip unit (11) and said applicator (12) including therein in a direction of the major axis thereof a laser beam transmitting glass fiber (5) connected to a laser oscillator (3) and being designed to use the terminal end of said glass fiber as an ejection source (15), said handpiece being characterized in that said glass fiber (5) is gripped centripetally by linear areas (12*a*) and (12*c*) of front and rear sides of the applicator (12) by a pair of resilient grippers (6) and (7) coaxially contained in said applicator (12), said gripper (6) is secured to the front of and projects out of the applicator and said resilient grippers (6) and (7) comprise a cylindrical elastic supporter (61) and a holder (62) and said gripper (7) is fixed to the connecting portion between the grip unit (11), said glass fiber is smooth-curvedly held in a contra angle portion (12*b*) and the applicator (12) comprises a tapered hole (11*a*) at the front end of the grip unit (11) and a rubber fastener (71) clamped by a collet (12*e*) at the rear end of the applicator (12).

4,503,854

LASER SURGERY

Geza J. Jako, 169 E. Emerson St., Melrose, Mass. 02176

Filed Jun. 16, 1983, Ser. No. 504,940
Int. Cl.³ A61B *17/38*
U.S. Cl. 128—303.1 **19 Claims**



1. Laser surgery apparatus comprising,

at least first and second laser sources of optical energy at different wavelengths for providing operating and aiming laser beams respectively,

means defining a common optical path for exchanging optical energy with a patient at the patient end of said path,

means including at least one perforated mirror for coupling said laser sources to said common optical path for allowing simultaneous delivery of optical energy from said first and second laser sources of said different wavelengths over said common optical path to said patient end,

and means for simultaneously moving said aiming and operating laser beams together over a region at said patient end.

4,503,855

HIGH FREQUENCY SURGICAL SNARE ELECTRODE

Harald Maslanka, Stockacher Strasse 172, D-7200 Tuttlingen, Fed. Rep. of Germany

Filed Dec. 30, 1982, Ser. No. 454,689
Claims priority, application Fed. Rep. of Germany, Dec. 31, 1981, 3152019; Dec. 23, 1982, 3247793
Int. Cl.³ A61B *17/39*
U.S. Cl. 128—303.15 **11 Claims**

1. An improved high frequency surgical snare electrode instrument, particularly for endoscopes, of the type having a guide channel (1) with an outer peripheral surface that is at least externally insulated, an electrode lead (3) slidably dis-

placeable in the guide channel, and a resilient snare electrode (5) attached to a free end of the electrode lead, capable of resiliently spreading apart when moved out of the guide channel and at least partially retractable into the guide channel by the electrode lead, said resilient snare electrode having first and second halves cooperatively defining a cutting loop portion used to surround a growth which is to be excised, the improvement comprising:

said first and second snare electrode halves extending away from said cutting loop portion to define a cooling extension, said first and second halves engaged intimately along said cooling extension; and

means maintaining said first and second halves intimately engaged along said cooling extension,

said cooling extension being movable relative to said guide channel upon slidably displacing said electrode lead within said channel;

said cooling extension increasing the heat capacity of said snare electrode, particularly at the cutting loop portion, to prevent failure of the snare occasioned by thermal stress.

4,503,856

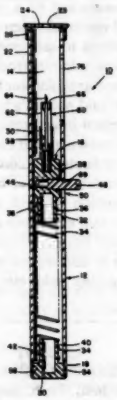
LANCET INJECTOR

William D. Cornell, Ballwin, and Carnot Evans, St. Louis, both of Mo., assignors to Sherwood Medical Company, St. Louis, Mo.

Continuation of Ser. No. 278,024, Jun. 29, 1981, abandoned. This application Apr. 7, 1983, Ser. No. 483,074

Int. Cl.³ A61B *17/34*

U.S. Cl. 128—314 **13 Claims**



1. A lancet injector comprising an elongate housing having a generally longitudinally extending slot in the sidewall thereof, a lancet holder longitudinally slidable in said housing and adapted to releaseably receive a lancet for piercing the skin, spring means in said housing having one end connected to said holder and the other end connected to a proximal end portion of said housing, and a control member extending through said slot and connected to said holder for manually moving said holder, said control member being movable to move said holder linearly in a proximal direction against the force of said spring means to a releasable retracted position thereby compressing said spring means, said control member being movable to release said holder from said retracted position so that the force of said spring means and the inertia of said holder during movement thereof moves said holder linearly in a distal direction to a lancet piercing position in which said spring means is tensioned so as to move said holder proximally from said piercing position to a neutral position where said spring means is in a free length neutral force condition, said control member being distally movable to move said holder to a lancet access position distally beyond said lancet piercing position.

4,503,857

PROGRAMMABLE CARDIAC PACEMAKER WITH MICROPROCESSOR CONTROL OF PACER RATE

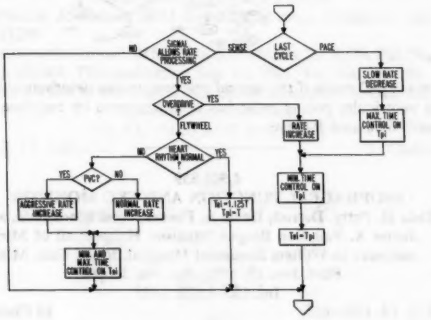
Willem Boute, Doesburg; Frederik H. M. Wittkampf, Brummen; Gerrit W. van Arragon, Dieren, and Kornelis A. Mensink, Brummen, all of Netherlands, assignors to Vitatron Medical B.V., Netherlands

Filed Oct. 25, 1982, Ser. No. 436,411

Claims priority, application European Pat. Off., Oct. 26, 1981, 81108940.8

Int. Cl.³ A61N *1/36*

U.S. Cl. 128—419 PG **17 Claims**



1. A pacer for use in a cardiac pacing system, having generating means for generating and delivering pacing pulses and sensing means for sensing natural heartbeat signals,

pacing rate means for continuously determining the pacing rate of said pacer and the corresponding pacing interval, said pacing interval being the time from a prior delivered pacing pulse to a next succeeding pacing pulse,

interval means for measuring the time interval elapsed from a prior pacing pulse or sensed heartbeat to a succeeding sensed heartbeat and determining means for determining whether said measured interval is less than said pacing interval by more than a predetermined factor, said pacing rate means having adjusting means for adjusting said pacing interval to vary as a function of said determination.

4,503,858

DEVICE FOR DETERMINING THE PACING MODALITY OF AN ARTIFICIAL CARDIAC PACEMAKER

Harold T. Markowitz, Ham Lake; John C. Rueter, Shoreview, and Gary J. Syring, Minneapolis, all of Minn., assignors to Medtronic, Inc., Minneapolis, Minn.

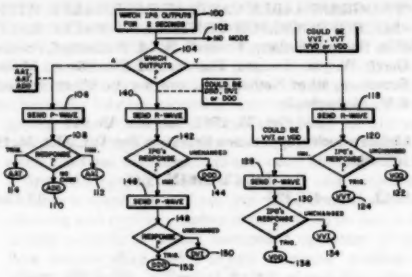
Filed Jun. 15, 1983, Ser. No. 504,699

Int. Cl.³ A61N *1/00*

U.S. Cl. 128—419 PT **3 Claims**

2. A pacing system analyzer for determining the mode of an implantable cardiac pacer comprising means coupled to said pacer for determining when a ventricular pulse is emitted by said pacer, first transmission means for transmitting a simulated ventricle R-wave to said pacer. First response determining means for determining the response of said pacer to said simulated R-wave and for indicating that the pacer is in a VOO mode if there is no change in response to said R-wave, for indicating that the pacer is in a VVT mode if the pacer responds by emitting further ventricular pacing pulse and for transmitting a simulated atrial P-wave to said pacer if said first response means determines that said pacer is in a ventricular inhibited mode in which the ventricular output pulse is inhibited in response to said simulated R-wave, second response means responsive to the transmission of said simulated P-wave

which determines that said caridac pacer is in a VVI mode if the cardiac pacer does not change its ventricle pulsing rate in response to said P-wave and which determines that the pacer is



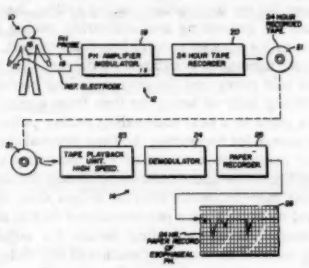
in a VDD mode if the second response means determines that a ventricular pacing pulse has been triggered by response to said simulated P-wave.

4,503,859

ESOPHAGEAL FUNCTION AND EKG MONITOR

Dale H. Petty, Detroit; David A. Penner, West Bloomfield, and James A. Van Den Berghe, Madison Heights, all of Mich., assignors to William Beaumont Hospital, Royal Oak, Mich.

Filed Jun. 16, 1983, Ser. No. 505,146
Int. Cl.³ A61B 5/00
U.S. Cl. 128—635 **16 Claims**



1. A gastroesophageal reflux monitor comprising:

a probe means for sensing a change in acidity which is adapted to be placed in a patient's esophagus;

a reference electrode adapted to be placed in contact with a patient's skin;

amplifier/frequency modulator means connected to the probe means and reference electrode for amplifying the voltage difference between the probe means and reference electrode and converting the voltage difference to a frequency modulated signal;

recorder means connected to the amplifier/frequency modulator means for recording the frequency modulated signal on a machine readable recording medium for a period of time;

playback means for scanning the recorded frequency modulated signal on the recording medium and providing a playback signal;

amplifier/frequency demodulator means for filtering, amplifying and converting the playback signal to an output voltage; and

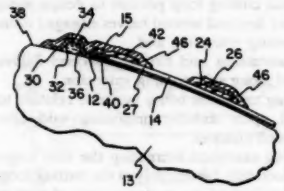
a display device responsive to the output voltage for creating a visually perceptible record of the sensed change in acidity of a patient's esophagus.

4,503,860

ELECTROENCEPHALOGRAPHY ELECTRODE ASSEMBLY

Marvin W. Sams, Dallas, Tex., and Samuel L. Wasson, Livonia, Mich., assignors to Bio-Scan, Inc., Dallas, Tex.

Filed Mar. 31, 1983, Ser. No. 480,858
Int. Cl.³ A61B 5/04
U.S. Cl. 128—639 **2 Claims**



1. An electrode assembly for use in making electroencephalographic records and the like, said electrode assembly including:

a circular disk type electrode member including a flange portion adapted to be placed in electrically conductive relationship with a patient's body, said electrode member being adapted to be held substantially stationary at a predetermined point on said patient's body;

a flexible electrical conductor having a first end electrically connected to said electrode member and a second end adapted to be connected to a signal amplifier disposed remote from said electrode member;

a tubular sleeve secured to said conductor at a point spaced about one inch from said electrode member and providing an enlarged surface area for anchoring said conductor to the skin surface of said patient's body with adhesive means to minimize electrical interference induced by movement of said conductor between said electrode member and said amplifier, said conductor including a flexible insulation cover and said insulation cover being of a thickness such that at least a portion of said conductor between said tubular sleeve and said electrode member is suspended out of contact with said patient's body; and

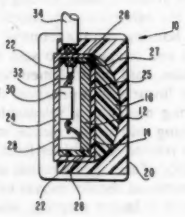
a connector member at said second end of said conductor for electrically connecting said electrode assembly to said amplifier.

4,503,861

FETAL HEARTBEAT DOPPLER TRANSDUCER

Robert R. Entrekin, Bothell, Wash., assignor to Biomedics, Inc., Issaquah, Wash.

Continuation of Ser. No. 483,985, Apr. 11, 1983,. This application Jun. 1, 1983, Ser. No. 500,061
Int. Cl.³ A61B 10/00
U.S. Cl. 128—661 **11 Claims**



1. A transducer for a doppler ultrasound fetal monitor, comprising:

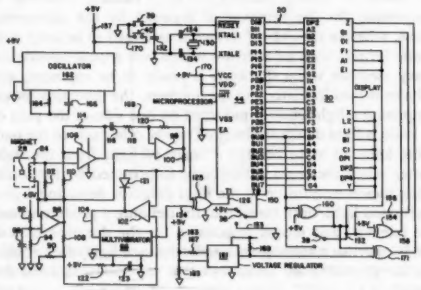
a. A substantially cylindrical, piston-type piezoelectric element;
b. An acoustic matching layer on said piezoelectric element;
c. A first acoustic lens on said acoustic matching layer;
d. A second acoustic lens on said first acoustic lens, wherein said first acoustic lens is convex, and said second acoustic lens is concave in the direction of said first acoustic lens and substantially flat in the direction of the patient, the curvature of the interface between said first and second acoustic lenses and the acoustic velocities of said first and second acoustic lenses, respectively, being selected so that the combination of said first and second acoustic lenses provide a divergent lens of selected acceptance angle with a substantially flat surface for patient interface.

4,503,862

TELEMETRY SYSTEM FOR MONITORING HOSPITAL PATIENT TEMPERATURE

Lee R. Baessler, Costa Mesa, Calif., assignor to Bronco Aleksich, Los Angeles, Calif., Trustee for Grennamyer Trust I

Continuation of Ser. No. 68,758, Aug. 23, 1979, Pat. No. 4,321,933. This application Aug. 31, 1981, Ser. No. 298,184
Int. Cl.³ A61B 5/00
U.S. Cl. 128—736 **3 Claims**



1. A patient temperature monitoring system comprising a plurality of transmitters, one associated with each patient to be monitored, and a receiver,

each transmitter comprising a thermistor for thermal contact with a portion of the body of a patient whose temperature is to be measured,

reference resistence means,

means coupled to said thermistor and said reference resistence means for providing a high frequency output signal having a duty cycle proportional to a ratio of value of resistence of said thermistor relative to said reference resistence means,

an electrical power supply coupled to said means for providing said output signal,

a normally open magnetically actuable switch interposed between said electrical power supply and said means for providing said output signal,

a transmitter case encompassing said electrical power supply, said magnetically actuable switch and said means for providing said output signal,

said receiver comprising:

demodulating means responsive to said high frequency transmitter output signal for providing an envelope signal of duration proportional to the duration of said transmitter duty cycle output,

microprocessor means coupled to receive an input from said demodulating means to calculate patient temperature in both Fahrenheit and Centigrade conventions,

display means coupled to said microprocessor output and including manually actuable selection means to alternatively display patient temperature in degrees Fahrenheit and degrees Centigrade an to indicate the convention displayed,

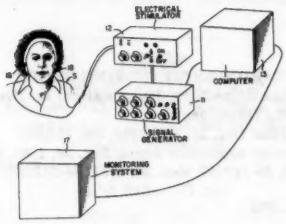
magnetic switch actuating means for selectively and momentarily closing said magnetically actuable switch by means of magnetic force in a selected, proximately located transmitter, to the exclusion of magnetically actuable switches in other transmitters, whereby said magnetically actuable switches in said plurality of transmitters are normally open and said transmitters exert no power drain on their respective electrical supplies unless said magnetically actuable switch in a selected transmitter is closed by said magnetic switch actuating means in said receiver.

4,503,863

METHOD AND APPARATUS FOR TRANSCUTANEOUS ELECTRICAL STIMULATION

Jefferson J. Katims, 5813 Greenspring Ave., Baltimore, Md. 21209

Continuation-in-part of Ser. No. 53,568, Jun. 29, 1979, Pat. No. 4,305,402. This application Sep. 15, 1981, Ser. No. 302,340
The portion of the term of this patent subsequent to Dec. 15, 1998, has been disclaimed.
Int. Cl.³ A61B 5/05; A61N 1/32
U.S. Cl. 128—741 **27 Claims**



1. A method of diagnostic and therapeutic treatment of a patient comprising the steps of

applying a source of electrical stimulation to the patient,

applying alternating constant current electrical stimulation from said source,

controlling the current and frequency of the stimulation within current parameters and through a range of frequency parameters including low frequencies which initiate non-adversive sensations.

12. Bio-electric stimulation apparatus for diagnostic and therapeutic treatment of a patient comprising

a source of alternating constant current electrical stimulation

means to apply said source of electrical stimulation to the patient,

means to control and vary the current and frequency of the stimulation within current parameters and through a range of frequency parameters determined by subjective sensations experienced by the patient,

said source of alternating constant current electrical stimulation being capable of variation of frequency at least between 5 to 573 hertz.

4,503,864

URINE SPECIMEN COLLECTION APPARATUS WITH A SEPARABLE COMPARTMENT

Jerry G. Powers, 1621 Post Dr., Omaha, Nebr. 68114

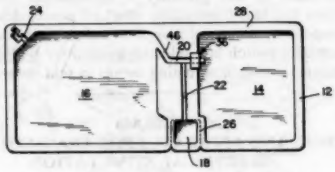
Filed Sep. 30, 1982, Ser. No. 428,942
Int. Cl.³ A61M 1/00
U.S. Cl. 128—760 **8 Claims**

1. A urine specimen collection apparatus comprising:

a urine collection tray having a specimen inlet, a sample compartment, a storage compartment, a waste fluid compartment, and a canal connecting said inlet to said sample compartment and said waste fluid compartment;

a covering disposed over said sample compartment, said waste fluid compartment, said storage compartment and said canal to close said compartments from ambient air;

said closed storage compartment holding implements to be used during a catheterization procedure for taking a urine sample; and



means defining a weakened line for separating said sample compartment from said tray;

whereby said fluid sample may removed from said tray for urinalysis.

4,503,865

HARDNESS MEASURING PROBE

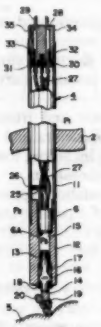
Yoshio Shishido, Sagamihara, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Dec. 22, 1982, Ser. No. 452,040

Claims priority, application Japan, Dec. 28, 1981, 56-212759; Dec. 28, 1981, 56-212760; Dec. 28, 1981, 56-212757

Int. Cl.³ A61B *5/10*

U.S. Cl. 128—774 **9 Claims**



1. A hardness measuring probe comprising

a tip member;

a pressure sensor mounted in said tip member and having a first pressure receiving surface on one side and a second pressure receiving surface on an opposite side;

a shaft slidably mounted in and projecting from said tip member, said shaft being disposed opposite from said first pressure receiving surface to effect a change in pressure on said first pressure receiving surface in response to relative movement between said shaft and said tip member;

a member rotatably mounted on said shaft for rollably contacting an object to be measured; and

a tube having said tip member fitted therein and having an aperture communicating said second pressure receiving surface of said sensor with the exterior of said tube.

4,503,866

CIGARETTE OR FILTER ROD CUT-OFF DEVICE

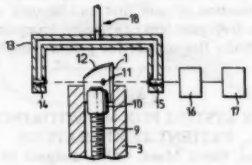
George W. Boult, and Richard R. King, both of High Wycombe, England, assignors to Molins PLC, London, England

Filed Apr. 26, 1982, Ser. No. 371,573

Claims priority, application United Kingdom, Apr. 28, 1981, 8113092

Int. Cl.³ A24C *5/28*

U.S. Cl. 131—84 C **5 Claims**



1. A cut-off device for a cigarette making machine comprising a rotary member arranged to carry at least one knife for cutting a cigarette rod during each revolution of the rotary member, means for sharpening the cutting edge of the knife and means for slowly feeding the knife radially outwards to compensate for the removal of material by the sharpening means, wherein the cut-off device is arranged to be used with a knife formed with an aperture which will appear outside the rotary member when the knife is ready to be replaced, and includes means for detecting the aperture, the detecting means comprising a light emitter mounted on one side of the path of the knife, a light detector mounted on the other side of the path of the knife so as to receive a beam of light from the light emitter when the beam is not being interrupted by the knife, timing means responsive to the light detector detecting a predetermined light/dark transition, for defining a predetermined time interval, and means responsive for the duration of said time interval to a subsequent predetermined light/dark tranistion for providing an indication that the hole has been detected.

4,503,867

APPARATUS FOR SEVERING A RUNNING WEB OF TIPPING PAPER OR THE LIKE

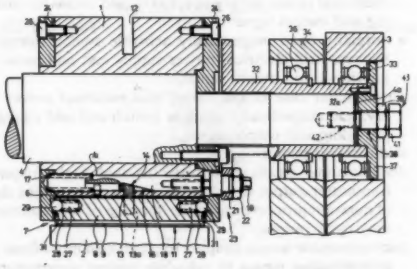
Karl-Heinz Barbe, and Erich Berger, both of Hamburg, Fed. Rep. of Germany, assignors to Hauni-Werke Körber & Co. KG, Hamburg, Fed. Rep. of Germany

Filed Sep. 22, 1982, Ser. No. 421,562

Claims priority, application Fed. Rep. of Germany, Jun. 1, 1982, 3220580

Int. Cl.³ A24C *5/56*; B26D *1/36*

U.S. Cl. 131—95 **17 Claims**



1. Apparatus for subdividing a running web, particularly a web of tipping paper in a filter tipping machine, into discrete sections, comprising a rotary knife carrier; a counterknife

adjacent to and defining with said carrier a path for the running web substantially at right angles to the axis of the carrier; a plurality of adjustable knives on said carrier; a discrete first adjusting device for each of said knives, each of said first adjusting devices including means for adjusting the respective knife substantially radially of said carrier; and an adjusting device common to said knives and including means for simultaneously moving all of said knives substantially radially of said carrier.

4,503,868

CIGARETTE MANUFACTURE

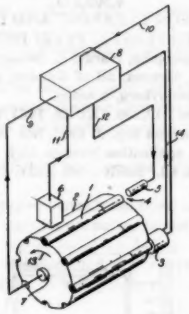
Raymond G. Coyte, High Wycombe, England, assignor to Molins PLC, London, England

Filed May 17, 1982, Ser. No. 378,736

Claims priority, application United Kingdom, May 20, 1981, 8115456

Int. Cl.³ A24C *5/00, 5/34, 5/345*

U.S. Cl. 131—282 **8 Claims**



1. Apparatus for controlling the timing of control signals concerning operations on conveyed cigarettes comprising means for generating the control signals, means for measuring the speed of transport of the cigarettes, and processing means arranged to receive from said measuring means a signal representing the measured speed of transport and arranged to be pre-programmed with data indicative of the distance to be travelled by a conveyed cigarette between a position occupied by the cigarette when a control signal is generated and a position to be occupied by the same cigarette when an associated operation is effected, and also with data indicative of the time delay between a control signal being released to an operating device and an associated operation being effected, wherein the processing means includes means for calculating from the received signals and the pre-programmed data the appropriate moment to release the control signals to ensure that the associated operation is effected with regard to the article for which it is intended.

4,503,869

CIGARETTE MOUTHPIECE

Daniel V. Cantrell, Prospect; Herman G. Bryant, Jr., Louisville; Robert L. Jones, Louisville; Marco A. Maccaferri, Louisville, and William M. McDaniel, Louisville, all of Ky., assignors to Brown & Williamson Tobacco Corporation, Louisville, Ky.

Filed Jun. 10, 1983, Ser. No. 503,120

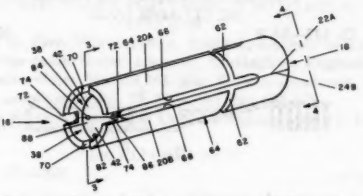
Int. Cl.³ A24F *3/04*

U.S. Cl. 131—336 **31 Claims**

19. A cigarette comprising:

a generally cylindrical tobacco column;

a generally cylindrical mouthpiece of two identically configured and sized semi-cylindrical sections disposed in mutual concavely facing relationship defining a smoke inlet end and mouth end, the mouthpiece being coaxial with the tobacco column with the smoke inlet end being adjacent to one end of the tobacco column, each of the semi-cylindrical sections having identically configured and sized means which cooperate to define at least one smoke flow capillary through the mouthpiece, and the semi-cylindrical sections having means defining at least one ventilation air groove at the concave surface of the mouthpiece with an end open at the mouth end of the mouthpiece; and,



air permeable tipping material circumscribing the generally cylindrical mouthpiece and overlapping a portion of the tobacco column adjacent to the smoke inlet end of the mouthpiece for attaching the mouthpiece to the tobacco column and allowing ventilation air be drawn into the at least one ventilation air groove upon smoking of the cigarette.

4,503,870

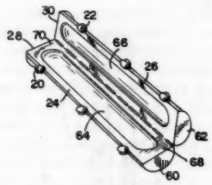
COIFFURE STYLING PROP

Luetta M. Peterson, P.O. Box 1247, Kankakee, Ill. 60901

Filed Oct. 11, 1983, Ser. No. 540,364

Int. Cl.³ A45D *8/26*

U.S. Cl. 132—9 **10 Claims**



1. A one-piece plastic hair styling device comprising:

a pair of substantially identical elongate body member halves hingedly connected together along one edge thereof and movable toward each other from an open position to a closed position to capture a plurality of treated hair strands therebetween in isolation from untreated hair, a plurality of snap-lock means along the free edges of said halves which include a first plurality of spaced apart stems extending perpendicularly outwardly from one elongate edge of said body member half, a corresponding second plurality of spaced apart stems extending perpendicularly outwardly from the other elongate edge of said body member half, each stem of said second plurality of stems being axially offset with respect to each corresponding stem of said first plurality of stems, whereby each stem of said first plurality of stems is paired with a different corresponding stem of said second plurality of stems when one elongate body half is hingeably pivoted toward the other elongate body half, a plurality of nodules having a hemispherical surface and a flat surface, said flat surface being attached to the outer end of each stem and disposed thereon so that when said body member halves are hingeably pivoted, nodules attached to paired stems initially cammingly engage each other along the hemispherical surfaces causing the stems to flex the nodules from a rest state away from each other and then toward each other to

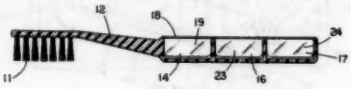
the rest state so the flat surfaces of said nodules lockingly engage when said body member halves are pivoted to a closed position.

4,503,871

DISPOSABLE TOOTHBRUSH

Burke H. Mendenhall, 10768 Downing St., Carmel, Ind. 46032

Filed Sep. 24, 1982, Ser. No. 422,553
Int. Cl.³ A46B *11/00*
U.S. Cl. 132—84 B **10 Claims**



1. A toothbrush comprising a head portion having a brush thereon, a shank portion extending from said head portion, and a handle extending from said shank portion,

said handle being generally hollow with cavity means having one substantially open elongate wall; and

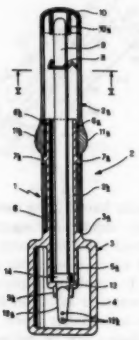
dentifrice package means in the cavity means of said handle and having cover means adhered to said handle and covering the package means and the cavity means to provide a closed cavity in the handle.

4,503,872

MAKE-UP UNIT WITH A SAFETY FASTENER

Jean-Louis M. Guéret, Paris, France, assignor to L'Oreal, Paris, France

Filed Jan. 25, 1983, Ser. No. 460,855
Claims priority, application France, Feb. 19, 1982, 82 02808
Int. Cl.³ A45D *40/30*
U.S. Cl. 132—88.5 **14 Claims**



1. In a make-up comprising:

(a) a container for liquid make-up;

(b) neck means to said container;

(c) a resilient sleeve in said container having an open end adjacent said neck and a bottom remote from said neck;

(d) a detachable applicator consisting of an applicator stem having an upper end and a lower end;

(e) a make-up member carried by said lower end of the applicator stem and bearing in a leak-proof manner on said bottom of the resilient sleeve;

(f) means defining an opening in said bottom, the make-up member being adapted to pass through the said bottom via said opening to penetrate into the container; and

(g) a cap surmounting the container and integral with said applicator stem, the improvement wherein:

(h) elastic connector means are provided to connect the applicator stem to the cap so as to obtain a relative translational axial movement between the cap and the applicator stem;

(i) the cap includes cut out means defining at least one tongue having a lower edge; and

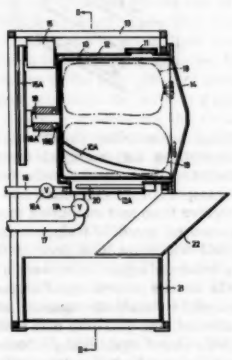
(j) the neck includes at least one longitudinal flexible tab and relief means carried thereby, said relief means and said at least one tongue being positioned such that on completion of assembly of the unit said at least one tongue is level with said relief means, said relief means being adapted to be engaged in said cut-out means adjacent said lower edge of said at least one tongue, and said at least one tongue being adapted to be deformed by pressure on said at least one flexible tongue to retract said shape means for allowing separation of the applicator from the container by a translational movement.

4,503,873

APPARATUS FOR CLEANING AND DISINFECTING USED PLASTIC PETRI DISHES

Lars B. Edebo, Linköping; Harald G. Swede, Malmö, and Nils-Erik Tornqvist, Sigtuna, all of Sweden, assignors to Assab Medicin AB, Sundbyberg, Sweden

Division of Ser. No. 313,349, Oct. 20, 1981, Pat. No. 4,417,926.
This application Sep. 9, 1983, Ser. No. 530,789
Claims priority, application Sweden, Oct. 20, 1980, 8007348
Int. Cl.³ B08B *3/06*; A61L *2/00*
U.S. Cl. 134—104 **6 Claims**



1. Apparatus for rendering harmless and cleaning of batches of agar plates comprising a plastic Petri dish containing an agar-based culture substrate and covered by a lid, said apparatus comprising:

(a) a heating chamber receptive of a large number of agar plates and having means for sealing it in substantially bacterium-tight manner, said sealing means including a bacterial barrier providing fluid communication between the heating chamber and the atmosphere at substantially zero pressure differential;

(b) means for feeding water into the heating chamber;

(c) means for heating the water in the heating chamber to a predetermined temperature of at least about 80° C. but not above about 98° C. in the heating chamber and maintaining the water at said temperature for a predetermined period of time sufficient for disinfection of the agar plates; and

(d) means for tumbling the agar plates in the heating chamber; and

(e) means for draining off the water through the bottom of the heating chamber.

4,503,874

FLOATING HEAD APPARATUS FOR SWIMMING POOL CLEANING SYSTEM

Rickie E. Norton, 1421 E. Garnet, Mesa, Ariz. 85204

Filed Aug. 4, 1983, Ser. No. 520,481
Int. Cl.³ E04H *3/20*; B08B *9/08*
U.S. Cl. 134—167 R **7 Claims**

1. Swimming pool cleaning apparatus, comprising, in combination:

water supply hose means for providing a flow of water and adapted to float on the surface of water in a swimming pool;

cleaning head means connected to the water supply hose means, including

a float disposed on the surface of the water,

a rim having a greater diameter than the float spaced apart from the float and disposed beneath the surface of the water, and

strut means extending between and connecting the float and the rim;

swivel means disposed beneath the float, including

a first swivel connector connected to and movable relative to the head, and

an elbow connected to the first swivel connector and receiving a flow of water from the water supply hose means;

whip means connected to the swivel means for receiving the flow of water from the elbow; and

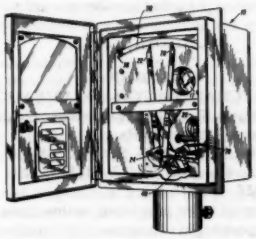
jet nozzle means connected to the water supply hose means for moving the cleaning head means randomly in the swimming pool.

4,503,875

GAS HIGH-LOW PRESSURE CONTROL APPARATUS

Gerald J. Murphy; Walter E. Pilie' , both of Houston, Tex., and Glenn Garaudy, Metairie, La., assignors to Autocon, Incorporated, Houston, Tex.

Filed Aug. 8, 1983, Ser. No. 521,472
Int. Cl.³ F15B *5/00*
U.S. Cl. 137—83 **11 Claims**



1. In a gas high-low pressure control apparatus having a helical bourdon tube sensing a control pressure and a gap sensor connected to a pressure indicator and rotating between high and low set point flags in which the gap sensor controls a pilot actuated valve controlling a gas supply the improvement comprising,

a pressure regulator connected between the gas supply and the inlet to the gap sensor,

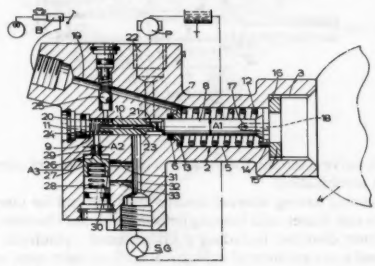
the outlet of the gap sensor connected to the valve, said outlet also providing a regenerative feedback signal to the regulator for providing a snap acting closing operation of the valve when the gap sensor detects a flag.

4,503,876

CONTROL VALVE FOR VEHICLE HYDRAULIC SYSTEMS

Glyn P. R. Farr, Warwickshire, England, assignor to Lucas Industries public limited company, Birmingham, England

Continuation of Ser. No. 355,343, Mar. 8, 1982, abandoned. This application Jul. 30, 1984, Ser. No. 635,475
Claims priority, application United Kingdom, Mar. 11, 1981, 8107693
Int. Cl.³ G05D *16/10*
U.S. Cl. 137—101 **4 Claims**



1. A control valve assembly for vehicle hydraulic systems of the type incorporating an hydraulic high pressure pump, a reservoir and an hydraulic accumulator storing accumulator pressure for supplying services and adapted to be charged from said pump, said control valve assembly comprising a piston movable in first and second opposite directions, a first spring biassing said piston in said first direction in opposition to accumulator pressure in said accumulator, a flow control valve adapted to cooperate with said piston and movable in first and second opposite directions, a second spring biassing said flow control valve in said first direction corresponding to said first direction in which said piston is biassed by said first spring, means defining a control chamber supplied from said pump pressure in said control chamber acting on said flow control valve in a direction corresponding to the direction in which said flow control valve is biassed by said second spring, and pump pressure acting on said flow control valve in the opposite said second direction, and on said piston in said first direction, an outlet for connection to said reservoir, a pilot dump valve movable between an open position and a closed position for controlling communication between said control chamber and said outlet, and a third spring acting solely on said dump valve for biassing it into said closed position to isolate said control chamber from said outlet, pressure in said control chamber acting on said dump valve in opposition to said third spring to urge it into said open position, means for determining a cut-out pressure for said accumulator comprising said third spring, and means for determining a cut-in pressure for said accumulator comprising said first spring, said accumulator being charged by said pump through said control chamber, which is exposed to accumulator pressure during charging of said accumulator, and at said cut-out pressure determined by said third spring said dump valve opens in response to pressure in said control chamber to connect said control chamber to said outlet, such that said flow control valve and said piston move against said first and second springs, said flow control valve being moved into an unloading position, in which it is maintained by said accumulator pressure acting on said piston, said dump valve subsequently closing, and following reduction

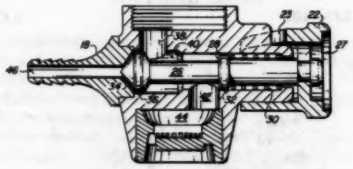
of said accumulator pressure due to operation of said services at said cut-in pressure determined by said first spring, said first and second springs move said piston and said flow control valve in said first direction to establish communication between said accumulator and said pump.

4,503,877

VALVE ASSEMBLY FOR AN AUXILIARY WATER FILTER

Raymond E. Ward, 1905 N. Val Vista, Mesa, Ariz. 85202, and Alan R. Garner, Mesa, Ariz., assignors to Raymond E. Ward, San Diego, Calif.

Filed Jul. 6, 1982, Ser. No. 394,907
Int. Cl.³ F16K *17/164*
U.S. Cl. 137—119 **1 Claim**



1. A valve assembly for the spigot of a water faucet comprising in combination:

a housing having internal threads at its top end for coupling to said faucet, said housing defining an inner chamber, said inner chamber including a first internal cylindrical bore and a second internal cylindrical bore, an inlet open to said first internal cylindrical bore and to said internal threads, said inlet having its longitudinal axis perpendicular to the longitudinal axes of said first and second internal cylindrical bores, a filter outlet coupled to said housing, and a sink outlet open to said second internal cylindrical bore, said sink outlet having its longitdinal axis perpendicular to the longitudinal axes of said first and second internal cylindrical bores;

spool means including a spool slidably mounted within said inner chamber for blocking said filter outlet and opening said sink outlet when placed in a first position and for blocking said sink outlet and opening said filter outlet when placed in a second position;

spring means in communication with said spool and said housing for forcing said spool to slide to said first position, said spool remaining in said first position while the flow from said spigot continues, and for exerting sufficient force to slide said spool to said first position from said second position when the flow from said spigot ceases, but further exerting insufficient force to slide said spool from said second position while a flow from said spigot continues;

sealing means including a first seal operably coupled to said spool proximate the filter outlet end of said spool for sealing said filter outlet when said spool is in said first position and for sealing said sink outlet when said spool is in said second position and a second seal operably coupled to said spool proximate said spring means for preventing water from coming into contact with said spring means in order to increase the useful life of said spring means and for preventing water from leaking from said housing; and

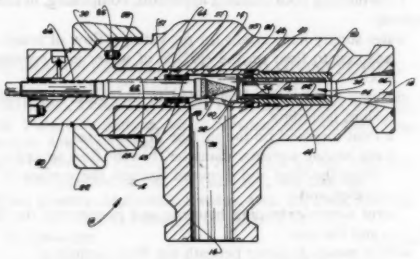
a user-accessible handle means for permitting a user to manually slide said spool from said first position to said second position including a handle rotatably coupled to the spring means end of said spool, said handle having a substantially cylindrical configuration which fits around and slidably engages a cylindrically-shaped portion of said housing and having a peripheral edge facing said housing, said peripheral edge having a notch operably disposed to flank a shoulder of said housing when said spool is in said first position, said peripheral edge resting upon the end of said shoulder after said handle is first pulled outward and then rotated to turn said notch away from said shoulder thereby overcoming the force exerted by said spring means and placing said spool in said second position, said peripheral edge having a retaining detent for locking said spool in said second position, said shoulder removably engaging said retaining detent while said spool is locked in said second position.

4,503,878

CHOKE VALVE

Kennard W. Taylor, Houston, Tex., assignor to Cameron Iron Works, Inc., Houston, Tex.

Filed Apr. 29, 1983, Ser. No. 490,183
Int. Cl.³ F16K *43/00*
U.S. Cl. 137—315 **4 Claims**



1. An adjustable choke valve comprising

a body having a valve chamber, an inlet to the valve chamber, an outlet from the valve chamber and an opening from said valve chamber aligned with said outlet,

a bonnet secured to said body in covering relationship to the valve chamber opening and having a tubular projection extending into said valve chamber,

a tubular valve seat insert having an external groove and a blast tube of erosion resistant material lining the interior of said insert and forming a valve seat at its inner end, a valve seat,

a valve member for coacting with said valve seat to control flow through said valve, means for releasably securing said bonnet tubular projection to said groove in the exterior of said tubular valve insert to retain said insert positioned in said valve chamber and to remove said valve seat insert and said valve member on removal of said bonnet from said body as a single unit for inspection for wear and possible replacement, and

means for moving the valve member toward and away from valve seat.

4,503,879

PLUG MECHANISM FOR WELLHEAD TOOL

Kenneth W. Lazarus, Shreveport, La., assignor to Joy Manufacturing Company, Pittsburgh, Pa.

Filed Nov. 4, 1983, Ser. No. 548,606
Int. Cl.³ F16L *55/12*; F16K *43/00*
U.S. Cl. 137—315 **9 Claims**

1. A tool adapted to be positioned against the outlet end of a valve on an operating wellhead assembly under pressure for removing and replacing the valve with the tool being in longitudinal alignment with the flowline in which the valve is positioned and in transverse alignment to a connecting passageway, which comprises:

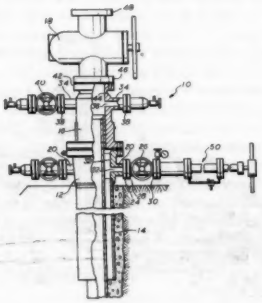
the tool having an outer elongated housing carrying a plug mechanism and an operating mechanism releasably connected to the plug mechanism;

the plug mechanism adapted to be positioned in the flowline

upstream of the inlet end of the valve adjacent the connecting passageway and having a plurality of outwardly movable latch members adapted to extend into the connecting passageway for holding the plug mechanism in a fixed position within the flowline upstream of the valve, the plug having a radially expanding elastomeric sealing element downstream of the latch members for engaging the inner circumference of the flowline in a fluid-tight sealing relation upstream of the inlet end of the valve to be removed;

the operating mechanism being manually operated through the housing adjacent the outlet end of the valve to be removed and operatively connected to the plug mechanism for selectively expanding the sealing element outwardly into sealing engagement with the flowline and for selectively moving the latch members outwardly into the connecting passageway for retaining the plug mechanism in fixed position within the flowline, the operating mechanism being releasable from the plug mechanism after actuation of the latch members and sealing element to permit removal of the valve;

the plug mechanism including a hollow generally cylindrical body member, a seal retaining member longitudinally slidably mounted with the body member at one end portion thereof, a threaded activating shaft longitudinally fixed inside the body member and threadably mounted with the seal retaining member, the sealing element being



mounted between a peripheral abutment around the body member and a peripheral abutment around the seal retaining member, the activating shaft being operable upon rotation in one direction by the operating mechanism to move the seal retaining member toward the body member thereby longitudinally compressing and radially expanding the sealing element, the activating shaft being operable upon rotation in the opposite direction by the operating mechanism to move the seal retaining member away from the body member thereby releasing the sealing element; and

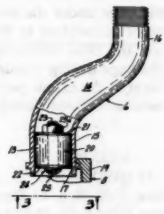
the plug mechanism further including a latch displacing member mounted on the end of the activating shaft away from the body member and a generally cup-shaped end cap received on the end of the seat retaining member forming a latch chamber enclosing the latch displacing member, the end cap having a plurality of slots formed therein having interior walls divergently angled toward the central longitudinal axis of the plug mechanism, the latch members comprising a plurality of ball bearings positioned within the chamber between the end cap and latch displacing member surrounding the activating shaft and being in a free abutting engagement with the activating shaft at all times, the activating shaft being operable upon rotation in one direction by the operating mechanism to move the end cap toward the latch displacing member such that the ball bearings ride or cam along an exterior portion of the latch displacing member for radially biasing the ball bearings contained within the latch chamber into the slots of the end caps so that the ball bearings extend beyond the circumference of the plug mechanism to hold the plug mechanism in a fixed position within the flowline upstream of the valve, the ball bearings having diameters larger than the other opening of the slot such that the bearings are unable to pass completely through the slots, and the activating shaft being operable upon rotation in the opposite direction by the operating mechanism to move the end cap away from the latch displacing member thereby allowing the ball bearings extending into the slots of the end cap to recede into the chamber to permit removal of the plug mechanism from the flowline.

4,503,880

FLUID DISTRIBUTION LOCKOUT APPARATUS

Sherman W. Hochman, Whitefish Bay, Wis., assignor to Wisconsin Gas Company, Milwaukee, Wis.

Filed Jul. 6, 1982, Ser. No. 395,857
Int. Cl.³ F16K *35/00*
U.S. Cl. 137—377 **8 Claims**



1. A fluid lockout apparatus for fluid system comprising a specially formed pipe section releasably secured into the flow system and including means to prevent ready removal of such pipe section, a lockout pipe section corresponding to said specially formed pipe section having sealing means sealing said pipe section, said sealing means is a separate expandable plug means adapted to be located within said lockout pipe section and having means for expanding of said plug means, said means for expanding of said plug means including an expanding actuator having an operator on at least one end of the plug means, said operator being specially constructed to receive a tool member for movement of the operator in a direction to expand said plug means, said operator including a coupling means to coact with said tool member and being arranged and constructed to prevent coupling of said tool member for opposite positioning of the operator and thereby essentially preventing collapse of the expanded plug means and non-destructive removal of said plug means, whereby said plug means can be introduced and sealed within said lockout pipe section on site and requires removal of the lockout section and destruction of the plug means for removal thereof.

4,503,881

AUTOMATIC COUNTERBALANCED SEWER VALVE WITH FLOAT CLOSURE

Fiore M. Vecchio, P.O. Box 672, Edmonton, Alberta, Canada

Filed Dec. 28, 1983, Ser. No. 566,160
Int. Cl.³ F16K *31/18, 33/00*
U.S. Cl. 137—425 **10 Claims**

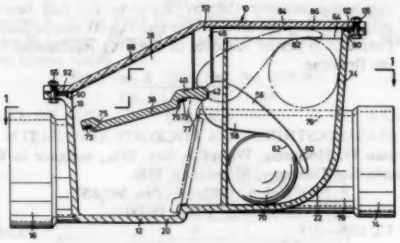
1. An automatic valve for a sewer or the like, comprising:

a body defining an upstream inlet and a downstream exit for liquid, and a path joining the inlet and exit,

a closure gate hingedly mounted to said body at a substantially horizontal axis located above said path, such that the gate can swing between a first position in which it blocks said path and a second position in which it unblocks said path;

arm means fixed with respect to the closure gate to swing therewith, in such a way that the arm means is higher when the gate blocks said path than it is when the gate unblocks said path, the arm means counterbalancing the closure gate so that the latter normally seeks said second position,

a cage surrounding the arm means and communicating with said path, and



a float member in said cage under the arm means, the float member being free of connection to the arm means, the body and the cage, the float following the arm means while guided by the cage during closure of the gate, and moving along the arm to the extent permitted by the cage in order to positively shut the closure gate.

4,503,882

FLOW VALVE

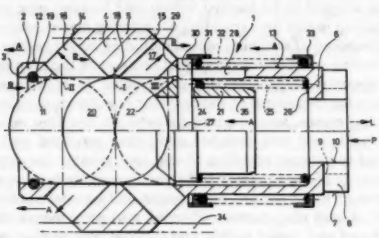
Rudolf Brunner, Baldham, Fed. Rep. of Germany, assignor to Heilmeier & Weinhlein Fabrik fur Oel-Hydraulik GmbH & Co. KG, Fed. Rep. of Germany

Filed Apr. 14, 1983, Ser. No. 484,925

Claims priority, application European Pat. Off., Apr. 16, 1982, 82103236.4

Int. Cl.³ F16K *17/18*

U.S. Cl. 137—454.5 **11 Claims**



1. Flow valve structure for both pressure flow and backflow with an external periphery having an internal bore through which extends a flow passage which exhibits both a working flow path (A) and a backflow path (R), this valve comprising a spring-loaded closing device in the form of a ball opposed to a valve seat (**18**) which blocks the backflow path once the working pressure has fallen below a certain pressure limit and positioned in the working flow path and by which it is possible for this closing device to be moved away from the valve seat by means of the working pressure, thus clearing the working flow path, characterized by the fact that both flow paths (A,R) are conducted via a common valve seat (**18**) and that the ball closing device (**20**) can be moved away from its closing position (I) at valve seat (**18**), which blocks both the working flow path as well as the backflow path, into a first open position (II) in which the ball clears the working flow path, this movement being directed in the working flow direction (P) and being activated by the working pressure, and by the fact that a spring means (**32**) opposes movement of the closing ball out of its closing position (I) into a second open position (III) by means of the backflow pressure which is directed in the backflow direction against the tension of the spring means, with the closing device clearing the backflow path R when in this second open position (III); further characterized by the fact the external periphery includes a thickened section (**4**) neighbored on at least one side by a section of reduced diameter, and that the working flow path includes a channel for pressure flow through the thickened section communicating with the bore; and further characterized in that the ball in its first open position (II) is at a stop position in the bore by which said flow channel through the thickened section is substantially fully open, and that the spring means opposing the ball, in its extended state, engages a stop means (**29**) so that the ball in position (I) is free of the spring force to move freely to position (II).

4,503,883

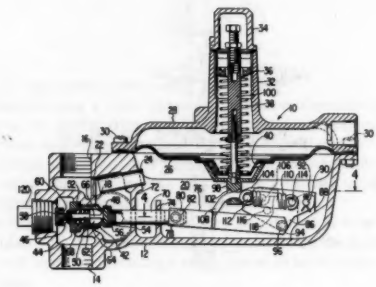
GAS PRESSURE REGULATOR WITH UNDER AND OVER SHUT-OFF

Thomas E. Meacham, Jr., Holland, Pa., assignor to The Singer Company, Stamford, Conn.

Filed Jun. 15, 1984, Ser. No. 620,764

Int. Cl.³ F16K *17/64*

U.S. Cl. 137—458 **4 Claims**



1. A gas pressure regulator comprising:

a housing having an inlet, an outlet, a transverse wall therebetween, and a chamber communicating with the outlet;

a diaphragm closing the chamber;

means yieldably loading the side of the diaphragm remote from the outlet;

an orifice member connected in the transverse wall having a first valve seat on the inlet side, a second valve seat on the outlet side, and a passage therethrough communicating with said first and second valve seats;

a regulator valve member cooperating with the second valve seat of the orifice member;

a shut-off valve member within the orifice member cooperating with the first valve seat, said shut-off valve member including a stem section extending through said passage of said orifice member to contact said regulator valve member under normal operating conditions of said regulator so that the shut-off valve member is prevented from contacting said first valve seat under such normal operating conditions;

means for yieldably biasing said shut-off valve member into closing contact with said first valve seat;

a plunger connected to said regulator valve member, said plunger extending into said chamber and supported for reciprocatory axial movement to move said regulator valve member toward and away from said second valve seat;

a link having a first end pivotally connected to the end of said plunger remote from said regulator valve member;

a plate mounted for pivotal motion about a first pivot point within said chamber, said plate being pivotally connected at a second pivot point to the second end of said link;

a stem member coupled for movement with said diaphragm and extending into said chamber; a lever coupled to said stem member, said lever being mounted on said plate for pivotal motion about a third pivot point; and

a coiled tension spring connected between a first anchor point on said lever and a second anchor point on said plate;

said first and second anchor points being so situated that a straight line drawn therebetween lies on a first side of said third pivot point under normal operating conditions of said regulator so that said lever and said plate pivotally move as one about said first pivot point over a range of chamber gas pressures to cause opening movement of the regulator valve member away from said second valve seat upon decrease of chamber gas pressure and closing movement of the regulator valve member toward said second valve seat upon increase of chamber gas pressure, and when the chamber gas pressure exceeds a predetermined upper limit the regulator valve member contacts said second valve seat so that said plate can no longer pivot about said first pivot point and the lever pivots relative to the plate about said third point to extend said spring and move the line between the first and second anchor points to the other side of the third pivot point to "break" the connection between the lever and the plate, said spring then contracting and thereby causing the plate to pivot about the first pivot point in a direction as to pull the link and plunger to move the regulator valve member away from said second valve seat a sufficient distance to allow said shut-off valve member to contact said first valve seat and thereby close said orifice member passage, and when the chamber gas pressure drops below a predetermined lower limit the lever and plate pivot as one about the first pivot point in said direction to such an extent that the regulator valve member is moved away from said second valve seat a sufficient distance to allow said shut-off valve member to contact said first valve seat and thereby close said orifice member passage.

4,503,884

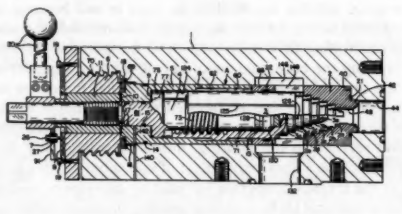
ANGLE GLOBE VALVE

Richard W. Spils, 1900 Wildwood La., Anchorage, Ak. 99503

Continuation of Ser. No. 390,982, Jun. 22, 1982, abandoned. This application Apr. 20, 1984, Ser. No. 602,093

Int. Cl.³ F16K *31/50, 37/00*

U.S. Cl. 137—553 **11 Claims**



1. In a multiple stage valve,

a valve body,

a valve member and a seat,

said valve member having plural steps matched by steps on said seat, to provide plural sets of steps, wherein each set comprises a step on the valve member and a corresponding step on the seat,

said valve member being movable from an open to a closed position,

said steps being configured and disposed such that in any open position of said valve member, a straight line can extend between said steps in spaced relation thereto,

said steps being of increasing diameter in one direction,

certain sets only of said steps being configured for seating engagement,

one of said certain sets comprising an intermediate set of said plural sets of steps,

certain of the other of said sets being configured so that they cannot engage one another but can only assume closely disposed positions.

4,503,885

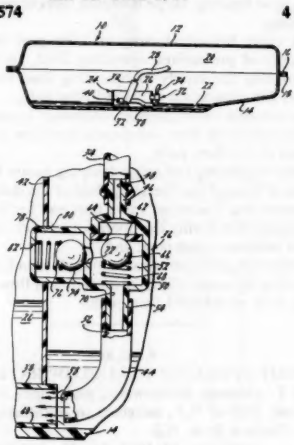
ENGINE FUEL SUPPLY SYSTEM

John F. Hall, Bloomfield Hills, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed Dec. 16, 1983, Ser. No. 562,267

Int. Cl.³ F17B *1/00*

U.S. Cl. 137—574 **4 Claims**



4. In an engine fuel system of the type having a fuel tank with a fuel pump for withdrawing fuel through its inlet from the tank in quantities greater than necessary for normal engine operation and including fuel return means from the engine to the fuel tank, a flow control device and reservoir assembly, comprising:

a reservoir assembly in the fuel tank having a vertical wall means about the fuel pump inlet, lower and upper openings in the reservoir wall for introducing fuel therein from the pump and the remainder of the tank;

a flow control device including thin walled enclosure means having an inlet portion connected to the fuel return means, a primary outlet portion spaced from but aligned with the lower opening in the reservoir to direct a relatively high velocity stream of fuel into the lower opening whereby additional fuel is drawn therewith into the lower opening to build the fuel level in the reservoir to an increased level with respect to fuel in the remainder of the tank when at a relatively low level, and a secondary outlet portion associated with the upper opening of the reservoir;

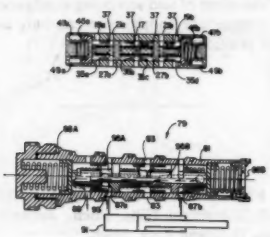
fuel pressure responsive means of the flow control device for normally regulating fuel to flow from the inlet portion to the primary outlet portion and alternately to the secondary outlet portion when the primary outlet portion is blocked.

4,503,886

FLOW LIMITING SELECTOR VALVE

William E. Simpson, Jr., Chamblee, Ga., assignor to Lockheed Corporation, Burbank, Calif.

Filed May 12, 1983, Ser. No. 494,084
Int. Cl.³ F15B *13/04*
U.S. Cl. 137—596 **5 Claims**



1. A flow limiting, surge damping directional control valve comprising:

(a) a valve housing having an inlet port for receiving a supply of pressurized operating fluid, an outlet port for returning the supply of operating fluid and a utilization port for connection to a fluid flow path;

(b) a movable valve member contained in said housing for controlling the flow and direction of flow of the operating fluid of the flow path;

(c) flow regulating and surge damping means for limiting the rate of flow of the operating fluid of the fluid flow path by constricting a selected valve port and for absorbing surge irregularities during the operation of said valve by sealing said selected valve port; and

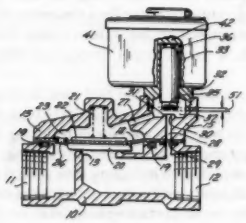
(d) means for positioning said movable member in said valve housing for controlling the direction of flow of the operating fluid of the fluid flow path.

4,503,887

PILOT-OPERATED DUAL FLOW RATE VALVE

Terence L. Johnson, Bridgewater, and Lance Guthreau, East Hanover, both of N.J., assignors to Automatic Switch Company, Florham Park, N.J.

Filed Jan. 19, 1982, Ser. No. 340,616
Int. Cl.³ F16K *31/145*
U.S. Cl. 137—624.13 **6 Claims**



1. A pilot-operated dual flow rate valve, comprising:

(a) a main valve component having a main orifice, the main valve component having an open position, in which fluid flows through the orifice at a relatively high rate, and a closed position in which there is no fluid flow through the orifice.

(b) a pilot valve component for controlling the main valve component, the pilot valve component having a pilot valve orifice surrounded by a valve seat, and a pilot valve member movable into and out of engagement with the pilot valve seat to close and open the pilot valve, respectfully, the pilot valve component having an open position in which fluid flows through the pilot valve component and in response thereto the main valve component opens, the total fluid flow leaving the valve being a combination of flow through the orifice of the main valve component and flow through the pilot valve component, and

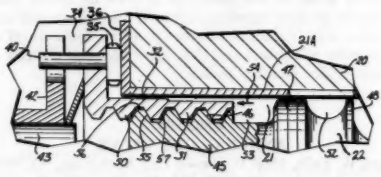
(c) means for decreasing the rate of fluid flow through the pilot valve component, while the main valve component is open, to a rate at which the main valve component closes, without terminating fluid flow through the pilot valve component, so that the total fluid flow leaving the valve is only the fluid flowing through the pilot valve component, this latter flow being at a relatively low rate, said flow-rate-decreasing means including controlling means for oscillating the pilot valve member in a direction toward and away from the pilot valve seat.

4,503,888

SERVOVALVE SPOOL CONTROL FOR DIGITAL ROTARY SERVOVALVE

Thomas E. Brovold, Eden Prairie, Minn., assignor to MTS Systems Corporation, Eden Prairie, Minn.

Filed Oct. 4, 1983, Ser. No. 539,052
Int. Cl.³ F17D *3/01*; F15B *21/02*
U.S. Cl. 137—625.65 **9 Claims**



1. In a rotary to axial converter for a servovalve assembly, said servovalve assembly including a housing, said housing having a bore with pressure supply, control and return ports, and a spool slidably mounted in the bore in said housing and having lands acting for valving the ports in the bore for selectively controlling flow with respect to the ports as the spool moves along the bore, said spool having a shank adjacent one end, the improvement comprising an external thread on said shank, and a nut having an internal thread mounted on said shank thread for threadable movement and having a reference position relative to the housing, means to rotationally drive said nut to cause a linear movement of said spool relative to the bore as the threads cooperate for relative movement, said nut having an external surface portion slidably mounted in the bore of the servovalve housing, and a portion forming a shoulder facing the spool and open to a return port positioned between the shoulder and one land on the spool to build up return pressure on a side of said nut toward said spool and between the shoulder and the one land, said mating threads between the interior of said nut and the shank thereby being forced so that preselected surfaces are in contact under return pressure exerted between the shoulder and the one land of the spool, the clearance between the exterior thread on the shank and the interior thread in the nut being maintained at a desired amount.

4,503,889

SHUTTLELESS WEAVING MACHINE COMPRISING MEANS FOR REMOVING DEFECTED WEFT THREADS FROM THE WEAVING SHED

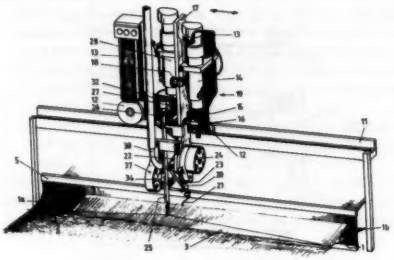
Hubert P. van Mullekom, Deurne, Netherlands, assignor to Ruti-te Strake B.V., Netherlands

Filed May 20, 1983, Ser. No. 496,403

Claims priority, application Netherlands, Jun. 1, 1982, 8202215

Int. Cl.³ D03J *1/00, 3/00*; D03D *51/34*

U.S. Cl. 139—1 R **1 Claim**



1. Shuttleless weaving machine comprising a detector for tracing defects on weft threads and means for removing defected weft threads from the weaving shed, the detector cooperating such with the driving apparatus of the weaving machine that the main machine shaft is rotated backwardly through an angle at a defect signal of the detector and thereby the latest weaving shed change is made undone in order to cancel the binding between the warp threads and the defected weft thread, characterized in that the means for removing a defected weft thread from the weaving shed are constituted by a device positioned outside the weaving shed and movable, when the machine is at stand still, in the weft direction along the beating up line of the cloth, said device having a loosening element movable in a plane transverse to the weft direction and therewith brushing the cloth at the position of the beating up line in the retracting direction of the reed, as well as a catching element movable from a position outside the weaving shed between the warp threads to a position inside the weaving shed at a distance from the beating up line, said catching element being adapted to catch the loosened weft thread and to pull it outwardly in the shape of a loop between two warp threads, a discharge-suction mouth being provided adjacent to the position of the catching element outside the weaving shed.

4,503,890

RELEASABLE HEDDLE ROD CONNECTOR

Charles F. Kramer, Greenville, S.C., assignor to Steel Heddle Mfg. Co., Greenville, S.C.

Filed Apr. 13, 1983, Ser. No. 484,542

Int. Cl.³ D03C *9/06*

U.S. Cl. 139—92 **15 Claims**

1. In a heddle frame for a loom of the type having upper and lower spaced frame slats connected by side frame members, heddle rods carried by said frame slats between which individual heddles are supported in said frame, apparatus for connecting said frame slat and said heddle rod comprising:

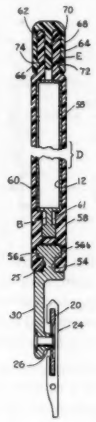
a fixed rod hook having a fixed shank portion stationarily affixed to said heddle rod and a free end flange portion extending freely away from said heddle rod in connectable alignment with said frame slat;

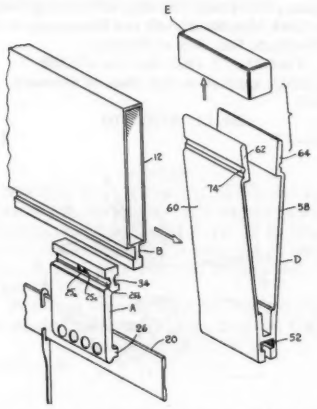
a connector portion carried by said frame slat;

slidable connecting sleeve means slidably carried on said connector portion of said frame slat for engaging said free end flange portion of said rod hook to releasably connect and disconnect said frame slat and said rod hook;

said connecting sleeve means sliding relative to said connector portion of said frame slat and said free end flange portion of said rod hook; and

said connecting sleeve means interlocking with said free end flange portion of said heddle rod hook in a connecting





position and sliding entirely off of said free end flange portion in a release position providing a quick assembly and disassembly of said heddle rod and frame slat of said heddle frame.

4,503,891

LOOM

Jiri Novak; Jan Pjgrt; Jan Bezdicek; Milan Fenik, all of Brno; Vladimir Kuda, Blazovice, and Vladimir Vasicek, Moravsky Krumlov, all of Czechoslovakia, assignors to ZVS Vyzkumnevyvojovy ustav koncernova ucelova organizace, Brno, Czechoslovakia

Filed Feb. 25, 1982, Ser. No. 352,377

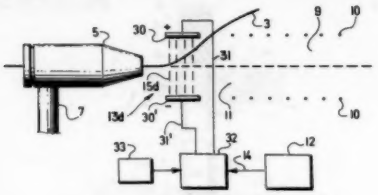
Claims priority, application Czechoslovakia, Mar. 2, 1981, 1452-81

Int. Cl.³ D03D *47/00*

U.S. Cl. 139—116 **2 Claims**

1. In a loom having a weft supply device, and a shed formed by upper and lower warp threads with an inlet side relative to weft insertion, and means for feeding weft into the shed, the improvement which comprises means disposed between the

means for inserting weft and the weft-entering side of the shed for the selective prevention of the feeding of the weft into the shed, said last named means being provided with a starting device, and a checking device, for detecting faulty weaving for controlling said starting device;



wherein the means for the selective prevention of weft insertion into the shed comprises a weft deflecting means formed by a pair of opposed electrodes between which the weft passes, at least one of said electrodes being connected by way of a switch to a high-voltage supply.

4,503,892

DEVICE FOR PRODUCING FLAT WOOD ARTICLES

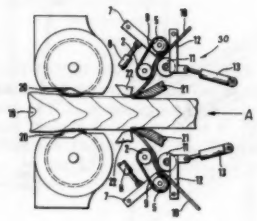
Siegmar Gönner, Oberkirch, Fed. Rep. of Germany, assignor to Gebrüder Linck Maschinenfabrik und Eisengiesserei "Gatterlinck", Oberkirch, Fed. Rep. of Germany

Filed Mar. 3, 1983, Ser. No. 471,638

Claims priority, application Fed. Rep. of Germany, Mar. 3, 1982, 3207548

Int. Cl.³ B27L *9/00*

U.S. Cl. 144—3 P **8 Claims**



1. A device for producing flat wood articles, such as boards, comprising oscillating cutting blades positioned at two opposite sides of a square timber trunk advanced in the direction of elongation thereof, said cutting blades separating flat boards from said trunk upon the advancement of the trunk in said direction whereby the boards separated from the trunk are curved and no chips are produced while said boards are separated from said trunk, each of the separated curved boards having one side facing the trunk and another side opposite to said one side; and a plurality of board straightening means each positioned immediately behind each blade as seen in said direction, each straightening means including an adjustable bending roll positioned against said one side of the curved board, and a driven rotatable counter pressure means positioned at another side of the curved board and disposed substantially against said bending roll, said counter pressure means forming a continuous flexible pressure surface when said counter means is driven, said pressure surface abutting against said another side of the board such that a pulling action is imparted to each board during its separation from the trunk and the board being processed becomes straightened.

4,503,893

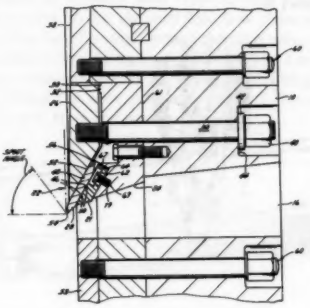
DISC TYPE WOOD CHIPPER KNIFE HAVING POSITIONING SERRATIONS AND INTERMEDIATE LAND THEREBETWEEN

Dino M. Demopoulos, Wausau, Wis., assignor to Murray Machinery, Inc., Wausau, Wis.

Filed May 25, 1983, Ser. No. 497,832

Int. Cl.³ B27C *7/10*; B02C *18/18*

U.S. Cl. 144—176 **8 Claims**



1. In apparatus for chopping material, comprising a rotatable disc and at least one radially disposed opening extending through said disc, a knife assembly comprising: first knife holding means attached to said disc and adjacent said opening; second knife holding means mounted on said first knife holding means; said first knife holding means comprising a knife seat secured to said disc and a counter knife secured to said knife seat and having a first knife-engaging portion including two spaced apart sets of protruding serrations thereon with an intermediate land therebetween; said second knife holding means having a second knife-engaging portion including a flat knife-engaging surface; a reversible knife having two cutting edges and mounted between said first and second knife holding means, said knife having a complementary flat surface for cooperatively engaging said flat knife engaging surface of said second knife holding means, said knife further having a side **51** opposite said flat surface with two spaced apart sets of indented serrations thereon with an intermediate land therebetween for cooperatively engaging said protruding serrations and said land on said counter knife; and clamping engagement means for clampingly engaging said knife between the counter knife of said first knife holding means and said second knife holding means.

4,503,894

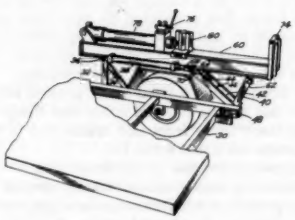
WOOD SPLITTING DEVICE

Kazmer Gratkowski, Rte. #3, Decatur, Mich. 49045

Filed Aug. 24, 1983, Ser. No. 526,007

Int. Cl.³ B27L *7/00*

U.S. Cl. 144—193 A **7 Claims**



1. In combination, a vehicle with a frame and a bed thereon

for hauling split wood, and a wood splitter mounted along the side of said bed, said wood splitter comprising:

(a) a beam disposed along said one side of said bed and having mounted thereon

(1) a splitting wedge,

(2) a power means for moving said wedge along said beam, and

(3) an anvil at one end for holding wood for the splitting operation;

(b) a guide and support means for said beam, having

(1) a pivot means connected to said vehicle frame, and

(2) a radially extending member rigidly connected to one end to said beam and at the other end to said pivot means, for movement in a vertical plane parallel with said one side of said bed, for supporting said beam

in a horizontal splitting operational position along said one side of said bed above said frame, with the anvil positioned at the rear end of the bed, and

in a vertical splitting operational position at the rear end of said bed, with the anvil positioned near the ground, and

(c) means for pivoting said guide and support means in said vertical plane and thereby moving said beam in an arc between said vertical and horizontal operational positions.

4,503,895

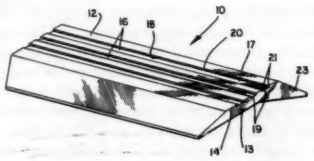
KNIFE WITH IMPROVED CUTTING EDGE FOR PRODUCING NOVEL WOOD FLAKE

Stanley D. Arasmith, P.O. Box 2458, Rome, Ga. 30164

Filed Sep. 27, 1982, Ser. No. 423,565

Int. Cl.³ B27C *13/00*

U.S. Cl. 144—373 **5 Claims**



1. A method of removing material from a wooden member comprising the steps of:

cutting across the end grain of said wooden member at a depth of about 0.04 inch with a plurality of cutting knives mounted to successively engage said wooden member;

each said knife having a back surface facing said wooden member during cutting, said back surface defining a plurality of grooves extending longitudinally at a depth of about 0.01 inch, said grooves being about one-eighth inch wide and spaced apart about one eighth inch; and said knife comprising an end face meeting said back surface at an angle to form a transverse serrated cutting edge;

said cutting step comprising removing a strip of material from said wooden member having a width of at least the distance across a plurality of said grooves.

4,503,896

DOG SYSTEM FOR VENEER SLICER

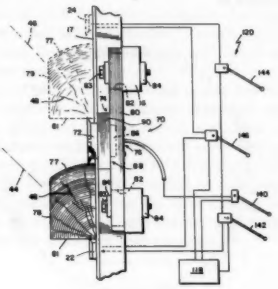
Robert D. Brand, Lawrence, Ind., assignor to Capital Machine Company, Inc., Indianapolis, Ind.

Continuation of Ser. No. 403,469, Jul. 30, 1982, abandoned. This application Feb. 3, 1984, Ser. No. 576,942

Int. Cl.³ B27L *5/08*

U.S. Cl. 144—369 **6 Claims**

6. A veneer slicer having a reciprocating flitch table, the flitch table providing a mounting surface for a flitch, top and bottom dogs for gripping the flitch and holding the flitch against the mounting surface, and a knife and pressure bar assembly movable along a path normal to the mounting surface, the improvement comprising a dog intermediate the top and bottom dogs, the top dog and the intermediate dog gripping and holding a first flitch section, the intermediate dog and bottom dog gripping and holding a second flitch section, means for mounting the intermediate dog to the flitch table,



and means for projecting the intermediate dog from a retracted position within the flitch table to a projected position a distance beyond the plane of the mounting surface, the projecting means including means for yieldably biasing the intermediate dog toward at least one of its projected and retracted positions relative to the plane of the mounting surface.

4,503,897

TOOL FOR USE WHEN FITTING WINDOW FRAMES, DOOR FRAMES AND LIKE STRUCTURES

Ebbe T. Dahlin, Norrskensvägen 8, S-175 61 Järfälla, Sweden

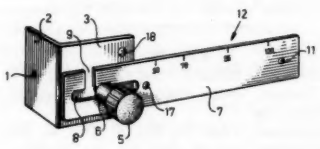
PCT No. PCT/SE83/00097, § 371 Date Nov. 9, 1983, § 102(e) Date Nov. 9, 1983, PCT Pub. No. WO83/03441, PCT Pub. Date Oct. 13, 1983

PCT Filed Mar. 17, 1983, Ser. No. 557,292

Claims priority, application Sweden, Mar. 24, 1982, 8201884

Int. Cl.³ B25B *29/00*

U.S. Cl. 145—1 R **6 Claims**



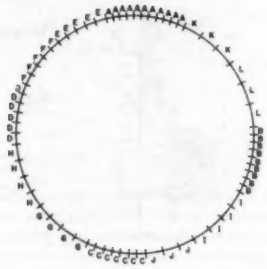
1. A tool for use when fitting window frames, door frames, and like structures to wall openings intended therefor, characterized in that the said tool includes two parts; in that one of said tool parts is angular in shape, having a first leg (2) which is arranged to be temporarily secured to the inside of the wall (15) adjacent the opening; in that the second tool part has the form of an elongate, flexible but not stretchable element (7) arranged to be permanently secured at one end thereof to the surface of the frame (13) facing the defining surface of the opening; and in that the other end of the elongate element (7) and the second leg (3) of said angular part are arranged to be temporarily locked together.

4,503,898

PNEUMATIC TIRE

Leo J. Hitzky, Walferdange, Luxembourg, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Sep. 14, 1983, Ser. No. 531,878
Int. Cl.³ B60C *11/10*
U.S. Cl. 152—209 R **8 Claims**



1. A pneumatic tire having a ground-engaging tread portion comprising a plurality of repeating design cycles disposed circumferentially adjacent each other about the circumference of said tire, said repeating design cycles having at least eight different lengths, said design cycles being disposed about the circumference of said tire such that at least 60% of all design cycles having the same pitch length are disposed circumferentially adjacent each other, the different design cycle lengths are such that the pitch ratio of each of the different design cycle lengths follow a mathematical relationship with the boundry conditions as set by the following two relationships:

$$V_i = V_1 + \text{Log}\left[1 + (10 - 1)\frac{i-1}{N-1}\right](V_N - V_1) \quad (1)$$

$$V_i = V_1 + \left(\frac{i-1}{N-1}\right)^2 (V_N - V_1) \quad (2)$$

wherein

V_1 is the smallest pitch ratio;

V_N is the largest pitch ratio;

N equals the number of pitches in the tire;

V_i is the pitch ratio of each of the pitches that have to be determined, the subscript i indicating which pitch of the total number of pitches is being determined.

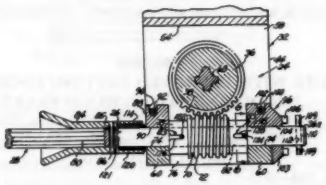
4,503,899

LOCKING MEANS FOR GEAR DRIVE

William F. Forquer, Venice, Fla., assignor to Security Shutter Corp., Venice, Fla.

Continuation-in-part of Ser. No. 331,257, Dec. 16, 1981,. This application Mar. 29, 1982, Ser. No. 362,523
The portion of the term of this patent subsequent to Dec. 27, 2000, has been disclaimed.
Int. Cl.³ E06B *9/08, 9/20*; F16H *57/10, 1/16*
U.S. Cl. 160—133 **1 Claim**

1. In a protective shutter assembly for an opening in a wall or the like comprising an articulated curtain of a plurality of interlocked elongated rigid slats assembled hingedly relative to each other, a drive mechanism for raising and lowering said articulated curtain, said drive mechanism comprising a shaft having an axis of rotation disposed substantially parallel to the longitudinal axis of said slats, and support members for rotatably supporting said shaft at each end for winding said curtain about said shaft, one of said support members being an open-ended enclosure having a pair of substantially parallel long sidewalls interconnected by a pair of substantially narrow sidewalls, means for supporting said enclosure from a wall with said relatively long sidewalls substantially perpendicular to the axis of said shaft, bearing means mounted on an end of said shaft and rotatably supported in a first aperture through one of said long sidewalls, a U-shaped saddle member having a second aperture providing a journal for a portion of said bearing means, a worm wheel mounted and coupled to said shaft within said U-shaped saddle member, a worm gear tangentially meshing with said worm wheel, a drive-shaft supporting said worm gear means coupling said driveshaft to said worm gear, bearing means for rotatably supporting said drive-shaft, fastening means for attaching said U-shaped saddle to the inside surface of said long sidewall with said apertures substantially aligned, and locking means for said drive mechanism, said locking mechanism comprising a first locking member mounted at an end of said driveshaft, a second locking member disposed stationary on close proximity with said first locking member, and biasing means longitudinally urging said driveshaft in a direction inter-engaging said first and second locking members in interlocked relationship, wherein said means cou-



pling said driveshaft to said worm gear comprises a first transverse pin disposed through said driveshaft and having at least one end projecting from said driveshaft, a longitudinal slot in a portion of said worm gear, said projecting end of said pin being slidably engaged in said longitudinal slot, and means preventing said driving gear from being displaced when said driveshaft is longitudinally displaced, wherein said first locking member comprises a second transverse pin disposed through said driveshaft at one end thereof and said second locking member comprises a stationary member surrounding said driveshaft at said one end thereof, and at least a pair of diametrically disposed radial grooves on an end face of said member, said pin having diametrically projecting ends for engagement with said grooves, and wherein said biasing means is a compressed coil spring disposed around said driveshaft, said compressed coil spring being disposed between said bearing means supporting said driveshaft and a socket member mounted at the other end of said driveshaft, said socket member having means for coupling with the end of a hand crank adapted to drive said driveshaft in rotation and to longitudinally displace said driveshaft for disengaging said locking members.

4,503,900

VENETIAN BLIND CONSTRUCTION

Susumu Osaka, Machida, and Midori Sagawa, Sagamihara, both of Japan, assignors to RCA Corporation, New York, N.Y.

Filed Aug. 16, 1982, Ser. No. 408,501
Int. Cl.³ E06B *9/30*
U.S. Cl. 160—172 **18 Claims**

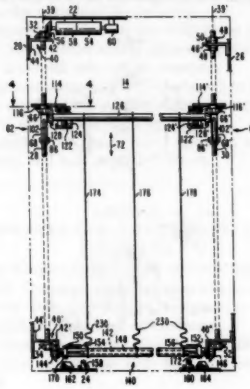
1. In a Venetian blind, apparatus for selectively rotating a slat and for moving the slat in a direction to lessen or increase the spacing between it and an adjacent slat comprising:

a threaded rod adapted to be rotated about its long axis;

a rotatable gear threaded about its axis of rotation, the gear threads being engaged with the rod threads; and

means for selectively restraining the gear from rotation so that it moves along the length of said rod in response to the rotation of said rod about its axis, for selectively locking the gear to said rod so that said gear is selectively

rotated by said rod, and coupled to and responsive to the rotation of said gear and to its movement along said rod



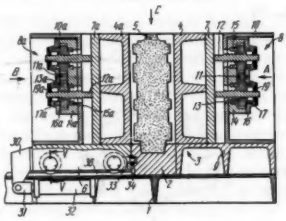
for selectively rotating said slat and for moving said slat in said direction.

4,503,901

SQUEEZING CASTER

Viktor N. Vinogradov, ulitsa Reutovskaya, 24, kv. 179, and Vladimir I. Smagin, ulitsa Domodedovskaya, 31, kv. 177, both of Moscow, U.S.S.R.

Filed Oct. 5, 1982, Ser. No. 432,849
Int. Cl.³ B02C *17/00*
U.S. Cl. 164—212 **6 Claims**



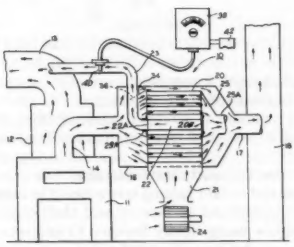
1. A squeezing caster comprising:
a bed;
a bottom plate attached to said bed;
an intermediate carrier member having first and second parts mounted on said bed;
two dies for forming the outer shape of a casting;
a first housing mounted on the first part of said carrier member;
a second housing mounted on the second part of said carrier member;
a first driving means for driving a first of said two dies in a longitudinal direction, accommodated in said first housing;
a second means for driving the second of said two dies in the longitudinal direction, accommodated in said second housing;
a first crosspiece mounted on the first of said two dies;
a second crosspiece mounted on the second of said two dies;
a first rack of said first driving means being connected to a rod of a drive cylinder;
a second rack of said second driving means being operatively connected to the first rack;
four pushers of said first driving means rigidly attached to said first crosspiece, each of said four pushers of said first driving means having a buttress thread on its outer surface;
four pushers of said second driving means rigidly attached to said second crosspiece, each of said four pushers of said second driving means having a buttress thread on its outer surface;
four gears of said first driving means having an internal thread meshed with the buttress thread of said four pushers of said first driving means, and outer teeth meshed with said first rack;
four gears of said second driving means having an internal thread meshed with the buttress thread of said four pushers of the second driving means, and outer teeth meshed with second rack, said second rack being operatively connected to said first rack by a link mounted on said first rack and kinematically coupled to said second rack to transmit movement from the first driving means to said second driving means, said second part preliminarily advancing the second of said two dies.

4,503,902

HEAT EXCHANGER FOR RECOVERING WASTE HEAT

Thomas C. Zolik, 4855 N. Rutherford, Chicago, Ill. 60656

Continuation-in-part of Ser. No. 277,248, Jun. 25, 1981, abandoned. This application Nov. 27, 1981, Ser. No. 325,562
Int. Cl.³ F24H *3/00*; F28D *7/02*; B60H *27/00*; F24B *7/00*
U.S. Cl. 165—47 **2 Claims**



1. In combination with a heating device having a heat supply duct for carrying heated air to a space to be heated, and an exhaust stack for carrying exhaust gases to a flue,
said combination comprising,
a self contained heat exchanger unit separate and apart from the heating device,
said heat exchanger unit including an outer housing operably interconnected between the exhaust stack and flue for conducting the exhaust gases therebetween,
a heat exchanger component having a main body within said housing and having inlet and outlet elements extending to the exterior,
the inlet element having an opening at the exterior at the bottom and the unit including means for impelling air from the exterior, ambient to the unit, through the inlet opening and into and upwardly through the heat exchanger component,
the heat exchanger component including a spiral member turned about a longitudinal axis extending between the exhaust stack and flue and having a substantial dimension along that axis and in radial direction,
the spiral member including opposed walls defining a spiral passage therebetween having an outer end communicating with the inlet element and an inner end forming a central space at the axis of small radial dimension communicating with the outlet element,
said outlet element leading upwardly from the unit and having an elevated portion communicating with the heat supply duct, and
control means for controlling said heating device which

itself includes heat sensing means in said elevated portion of said outlet element and operable for so controlling said heating device according to the temperature of the air in said elevated portion,

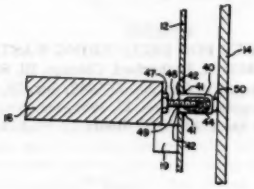
said walls also defining spaces between the adjacent turns of the spiral passage extending axially through the component for carrying exhaust gases therethrough and thereby through the component, and the housing and component being so selectively dimensioned as to provide an additional space therebetween nearly around the component and opening at both ends axially.

4,503,903

HEAT EXCHANGER TUBE SHEET RADIAL SUPPORT

Arthur W. Kramer, St. Petersburg, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 6, 1982, Ser. No. 395,549
Int. Cl.³ F28F 7/00
U.S. Cl. 165—76 **5 Claims**



1. A heat exchanger, comprising:

a generally cylindrical shell member;

a generally cylindrical wrapper, said wrapper being disposed within said shell member in coaxial and concentric relation;

a jacking screw disposed through a radial hole in said wrapper, a first end of said jacking screw being in contact with the inner cylindrical surface of said shell member, said jacking screw being rigidly fastened to said wrapper;

a locking screw having a first end which is threaded into a hole in a second end of said jacking screw; and

a tube support plate of said heat exchanger having a generally cyindrical outer surface, said tube support plate being disposed within said wrapper in concentric relation, said generally cylindrical outer surface being in contact with a second end of said locking screw.

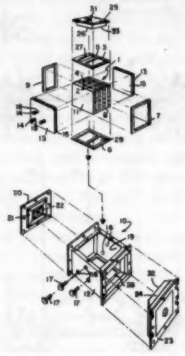
4,503,904

HEAT RECUPERATOR WITH TRIPLE PASS CROSS-FLOW CERAMIC CORE

Ray L. Newman, Towanda, and David H. Hopkins, Camptown, both of Pa., assignors to GTE Products Corporation, Stamford, Conn.

Filed Dec. 1, 1983, Ser. No. 556,871
Int. Cl.³ F28F 9/00
U.S. Cl. 165—76 **3 Claims**

1. A heat recuperator comprising a ceramic core comprising ribbed layers, the core having an air-in face and an air-out face, the core also having a hot-gas-in face and a hot-gas-out face and, in addition, two solid faces, the direction of flow of air through the core being orthogonal to the direction of flow of hot gas through the core, the layers through which air flows being separated by divider ribs into three sections so that the air passes thrice through said layers, the core being disposed within a metal housing having an air-in side and, opposite thereto, an air-out side, said air-in and air-out sides having cast ceramic material thereat having landed surfaces thereon in gasket-sealing correspondence with the perimeters and divider rib edges of the respective air-in and air-out faces of the core, the housing having a hot-gas-in side and, opposite thereto, a hot-gas-out side, said hot-gas-in and hot-gas-out sides having cast ceramic material thereat having landed surfaces thereon in gasket-sealing correspondence with the perimeters of the respective hot-gas-in and hot-gas-out faces of the core, the housing having two closed sides, said closed sides being in correspondence with the solid faces of the core, and means within the housing for applying compression to said two solid faces.

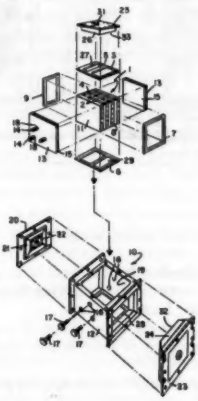


4,503,905

METHOD OF MAKING CERAMIC CORE HEAT RECUPERATOR

Ray L. Newman, Towanda, and David H. Hopkins, Camptown, both of Pa., assignors to GTE Products Corporation, Stamford, Conn.

Filed Dec. 15, 1983, Ser. No. 561,844
Int. Cl.³ F28F 9/00
U.S. Cl. 165—76 **6 Claims**



1. The method of making a heat recuperator comprising a cross-flow ceramic core within a metal housing comprising the steps of:

(a) providing a ribbed layered cross-flow ceramic core having an air-in face and an air-out face, a hot-gas-in face and a hot-gas-out face, and two solid faces, alternate layers of the core being layers through which air flows and being separated by divider ribs into three sections so that the air passes thrice through said layers;

(b) providing a metal housing having an air-in side and an air-out side, a hot-gas-in side and a hot-gas-out side, and two solid sides;

(c) providing triple pass gaskets for the air-in and air-out faces of the core, there being a cross piece on each gasket for sealing against edges of the divider ribs;
(d) inserting the core into the housing;
(e) providing compression on the solid faces of the core by means of compression means disposed between said solid faces and the solid sides of the housing;
(f) providing cast ceramic material shaped to provide triple pass flow, and having landed surfaces thereon, at the air-in and air-out sides of the housing; and
(g) sealing said triple pass gaskets between said air-in and air-out faces and said landed surfaces.

4,503,906

SURFACE HEATER STRUCTURE, ESPECIALLY FOR VEHICLES

Rudolf Andres; Helmut Grantz, both of Sindelfingen; Wolf-Dietrich Münzel, Ehningen, and Wolfgang Odebrecht, Sindelfingen, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Nov. 4, 1982, Ser. No. 439,184

Claims priority, application Fed. Rep. of Germany, Nov. 6, 1981, 3144089

Int. Cl.³ F28D *15/00*

U.S. Cl. 165—104.21 **3 Claims**

1. A surface heater structure which is constructed as expanded partial composite laminated body means and which contains two mutually separated channel means, adjoining one another wall-to-wall in a heat-conducting manner, of which one channel means that is hermetically closed and extends over substantially the entire surface of the surface heater body means forming a heat-pipe channel system, is constructed and operates as heat-pipe means, and of which another channel means extending along the lower side of the surface heater body means which forms a heat channel, is adapted to be traversed by heating water, characterized in that the partial composite laminated body means is constructed as two-layer body and includes a substantially rectilinear continuous non-expanded strip means between the heat channel and the heat-pipe channel system, said body means being bent U-shaped along this strip for mutual abutment of the heat channel and of the heat-pipe channel system, and in that the mutually abutting wall parts thereof are heat-conductingly connected with each other over substantially the entire contact area.

4,503,907

HEAT EXCHANGER COATED WITH AQUEOUS COATING COMPOSITION

Tatsumi Tanaka, Odawara; Kiyoshi Hikita; Masaru Furuhashi, both of Yokohama; Toshio Hatada, Shimizu; Katsuzi Nakano, Shimizu, and Akira Arai, Shimizu, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 5, 1980, Ser. No. 156,794

Claims priority, application Japan, Jun. 8, 1979, 54-71230

Int. Cl.³ F28F *19/02*

U.S. Cl. 165—133 **9 Claims**

1. A heat exchanger coated with an aqueous coating composition comprising a plurality of spaced fins with narrow distance in parallel to form flow passages between fins and a plurality of heat transfer pipes passing through said fins, the both surfaces of said fins being coated with an aqueous coating composition comprising 100 parts by weight of a resin component for water paint in solids content, 5 to 95 parts by weight of a surface active agent and 5 to 65 parts by weight of synthetic silica and baked at a temperature of 120° C. to 200° C. for 10 to 40 minutes for curing to give a coating film of 3 to 20 μm, whereby said fins are provided with hydrophilic surfaces having excellent corrosion resistance and surface hardness.

4,503,908

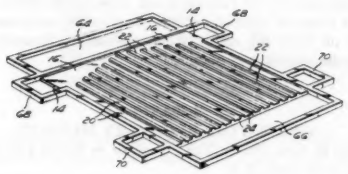
INTERNALLY MANIFOLDED UNIBODY PLATE FOR A PLATE/FIN-TYPE HEAT EXCHANGER

Irwin E. Rosman, Woodland Hills, and William R. Wagner, Los Angeles, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Division of Ser. No. 80,877, Oct. 1, 1979, Pat. No. 4,347,896. This application Apr. 30, 1982, Ser. No. 375,512

Int. Cl.³ F28F *3/04*

U.S. Cl. 165—167 **26 Claims**



1. A plate for a plate/fin-type heat exchanger, comprising:
an open-faced unibody plate, for channeling a fluid;
at least one side port transversely oriented through the top edge of said open-faced plate;
one pair of integral auxiliary side manifolds for each of said side ports wherein each pair comprises one integral auxiliary side manifold positioned at said side port and a second integral auxiliary side closed manifold diagonally positioned on the opposite side wall;
means for internally manifolding, wherein said means are contiguous with said side port;
a closed end lateral with and adjacent to said means for internally manifolding;
a plurality of contact fins and channels for directing fluid flow and for enhancing heat transfer, and wherein contact fins and channels are contiguous with and transverse to said means for internally manifolding;
an open end port contiguous with said contact fins and channels; and
a flat bottom for mating with said fins and said open face of an adjacent plate.

4,503,909

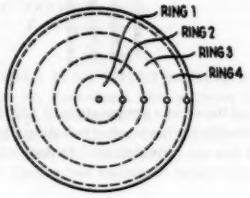
OIL RECOVERY PROCESS AND SYSTEM

Perry A. Argabright, Larkspur, and John S. Rhudy, Littleton, both of Colo., assignors to Marathon Oil Company, Findlay, Ohio

Division of Ser. No. 275,594, Jun. 19, 1981, Pat. No. 4,433,727. This application Sep. 16, 1983, Ser. No. 532,741

Int. Cl.³ E21B *43/22, 49/00*

U.S. Cl. 166—252 **11 Claims**



7. In a process for recovering oil from a subterranean oil-bearing formation having located thereat at least one input well and at least one output well through which the oil in the formation is recovered in response to a force applied by a displacement fluid, comprising: obtaining a sample from the subterranean oil-bearing formation, said sample being in the form of a disc having an axial bore formed therein; encasing the disc in a container whereby fluids infused into the disc pass into the axial bore thereof and are caused to flow radially with respect to the bore to simulate the flow of fluids in the oil-bearing formation; removing residual fluids including oil from the sample; infusing the sample with oil to restore it to a natural oil saturation condition; flooding the sample with a predetermined pore volume of a polymer solution containing a preselected concentration of a polymer having a known average molecular weight and molecular weight distribution; and measuring the amount of oil recovered from the sample by the polymer flood; monitoring the mobility of the polymer flood both at and away from the point of infusion of the polymer flood into the sample; and utilizing the oil recovery and polymer mobility data to select a polymer solution capable of achieving optimum recovery of oil from the subterranean oil-bearing formation from which the sample was obtained.

4,503,910

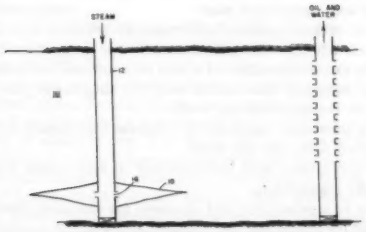
VISCOUS OIL RECOVERY METHOD

Winston R. Shu, Dallas, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 7, 1982, Ser. No. 447,731

Int. Cl.³ E21B *43/24*

U.S. Cl. 166—263 **10 Claims**



1. A method of recovering viscous oil from a subterranean, low transmissibility, viscous oil-containing formation not more than 2500 feet in depth comprising:

(a) fracturing said formation in the lower portion thereof through an injection well penetrating said formation so as to form a radially extending horizontal fracture around said well;

(b) penetrating the formation with at least one production well spaced apart from said injection well, said production well being in fluid communication with the upper two-thirds or less of the vertical thickness of the formation;

(c) injecting a predetermined amount of steam into said fracture in the lower portion of the formation via said injection well and recovering fluids including oil from the formation via said production well;

(d) subsequently shutting in said injection well and continuing to recover fluids including oil from the formation via said production well for a predetermined period of time and recovering fluids including oil from the formation via the production well without steam breakthrough;

(e) injecting a predetermined amount of a thermal fluid comprising hot water into the formation via said injection well; and

(f) continuing to recover fluids including oil from the formation via said production well until the recovered fluids contain an unfavorable amount of steam or water.

4,503,911

THERMAL RECOVERY METHOD FOR OPTIMUM IN-SITU VISBREAKING OF HEAVY OIL

Kathy J. Hartman, Arlington, and Winston R. Shu, Dallas, both of Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 331,424, Dec. 16, 1981, abandoned. This application Jun. 16, 1983, Ser. No. 504,998

Int. Cl.³ E21B *43/24*

U.S. Cl. 166—272 **5 Claims**

1. A method of recovering viscous oil from a subterranean, viscous oil-containing formation, comprising:

(a) providing an injection well in fluid communication with the middle 40 to 60 percent of the oil-containing formation;

(b) injecting 20 to 300 barrels of steam per foot of pay zone over a period of time from 10 to 100 days at a temperature within the range of 400° to 700° F. and a quality within the range of 60 to 95 percent into the oil-containing formation via said injection well to maximize visbreaking of the oil due to minimum heat losses;

(c) terminating injection of said steam and thereafter recovering fluids including oil from said formation via said injection well until the production of oil in the fluids being recovered reaches an undesirable low level.

4,503,912

PROCESS FOR CONFORMANCE CONTROL USING A POLYMER FLOCCULATE

Charles J. Norton, Denver, Colo., assignor to Marathon Oil Company, Findlay, Ohio

Filed Jun. 13, 1983, Ser. No. 503,994

Int. Cl.³ E21B *33/138*

U.S. Cl. 166—295 **13 Claims**

1. A process for reducing permeability in at least one relatively highly permeable zone of a subterranean formation also containing at least one relatively less permeable zone, said formation penetrated by a well in fluid communication therewith, the process comprising the sequential steps of:

(a) injecting an aqueous solution containing a high molecular weight, water soluble, organic polymer into said at least one relatively highly permeable zone via said well whereby said polymer substantially penetrates said at least one relatively highly permeable zone; and

(b) injecting via said well a slightly acidic aqueous solution containing a polyvalent cation in at least a stoichiometric amount relative to the reactive groups of said polymer into said at least one relatively highly permeable zone penetrated by said polymer wherein said cation contacts said polymer to produce a flocculate in situ, which sub-

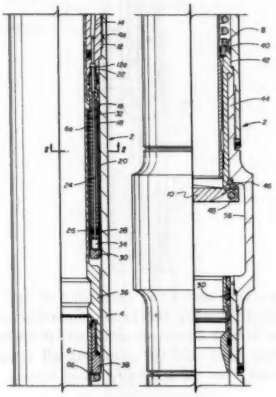
stantially reduces the permeability of said at least one relatively highly permeable zone.

4,503,913

SUBSURFACE WELL SAFETY VALVE

Michael A. Carmody, Broken Arrow, Okla., assignor to Baker Oil Tools, Inc., Orange, Calif.

Filed Jul. 18, 1983, Ser. No. 514,653
Int. Cl.³ E21B *34/10*
U.S. Cl. 166—319 **8 Claims**



1. A hydraulically actuable well tool for use in a subterranean well, comprising:

a housing having a bore therethrough;

a tubular member axially shiftable in the bore of the housing relative to the housing;

a spindle attached to the housing and extending axially between the housing and the tubular member in the bore of the housing;

a sleeve disposed concentrically around the spindle and axially shiftable relative thereto, and defining an enclosed cavity at one closed end of the sleeve;

seal means adjacent the enclosed end for establishing sealing integrity between the spindle and the sleeve;

means for attaching said sleeve to said tubular member; and

control fluid actuating means including a path extending through the spindle and into the enclosed cavity between the seal means and the one end of the sleeve relative to said spindle, axial movement of the sleeve being transmitted to the tubular member to move the tubular member relative to the housing.

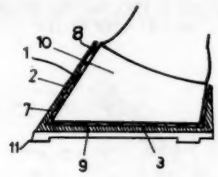
4,503,914

HORSESHOE APPARATUS FOR EQUIDAE

Frederic Voland, 16 Av Henri Barbusse, 13760 St. Cannat, France

Filed Nov. 24, 1982, Ser. No. 444,313
Claims priority, application France, Nov. 27, 1981, 81 22460
Int. Cl.³ A01L *3/00, 5/00*
U.S. Cl. 168—18 **31 Claims**

1. Horseshoe apparatus for Equidae intended for the protection of the feet of horses, ponies, donkeys, mules and similar animals comprising the combination of a flexible and elastic inner housing material within an outer cover of rigid material covering the whole surface of the hoof wherein said flexible and elastic inner housing material comprises natural and synthetic rubber and synthetic resins and is stamped or cast to exactly fit the shape of the toe, nob, crust, and frog of said feet.

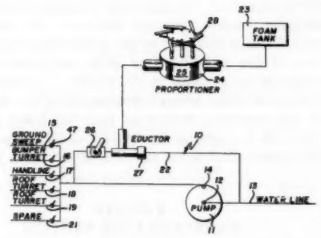


4,503,915

PROPORTIONING SYSTEM

John P. Gagliardo, Shrewsbury, and Albert J. Pruneau, Worcester, both of Mass., assignors to Feecon Corporation, Westboro, Mass.

Continuation of Ser. No. 354,549, Apr. 3, 1982, abandoned. This application Apr. 4, 1984, Ser. No. 597,191
Int. Cl.³ A62C *35/00*
U.S. Cl. 169—15 **8 Claims**



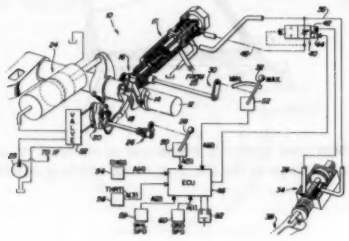
8. Proportioning system including a pump whose inlet is connected to a source of primary fluid and whose outlet is connected to a plurality of distribution elements and including a recirculation branch joining the outlet to the inlet and having a source of secondary fluid, comprising:

a proportioner having a housing with an input chamber joined to the source of secondary fluid and with an output chamber joined to the recirculation branch, a plurality of valves joining the input chamber to the output chamber, each valve corresponding to one of the distribution elements and having a passage that is sized to correspond to the secondary fluid requirements of its distribution element, wherein the valves are arranged in a group, wherein the housing has a side wall surrounding the said group, wherein the housing has a top and a bottom wall at the ends of the side wall and an intermediate wall extends across the side wall to divide the housing into the said input chamber and the output chamber, wherein the valves have stems extending through the top wall, wherein actuators are mounted on the outer surface of the top wall, each actuator being operatively connected to one of the valve stems, wherein a plate is mounted so that it lies parallel to and spaced from the said top wall, and wherein a set of adjustable stops is mounted on the plate, each stop being in alignment with a part of a valve.

4,503,916
HYBRID HITCH CONTROL SYSTEM

Gordon K. Wiegardt, Cedar Falls, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Jun. 6, 1983, Ser. No. 501,690
Int. Cl.³ A01B *63/112*
U.S. Cl. 172—3 **15 Claims**



1. In an engine-driven vehicle hitch control system having a draft sensor for generating a non-electrical draft signal representing draft force applied to the hitch, a position sensor for generating a non-electrical position signal representing a position of the hitch, actuating means for raising and lowering the hitch as a function of non-electrical signals communicated thereto, and means for communicating the non-electrical signals to the actuating means, the improvement comprising:

parameter sensing means for sensing an operating parameter of the vehicle other than draft force and hitch position;

generating means for generating an electrical control signal as a function of the operating parameter; and

modifying means coupled between the communicating means and at least one of the sensors for modifying at least one of the non-electrical draft and position signals in response to changes in the electrical control signal, the communicating means communicating the modified signal to the actuating means so that the hitch is raised and lowered in response to changes in the sensed parameter, the sensed draft force and the sensed hitch position.

4,503,917
CARRIAGE FEED SYSTEM

Richard J. Hargenrader, Orrville, and James A. Miller, Strasburg, both of Ohio, assignors to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Oct. 18, 1982, Ser. No. 434,892
Int. Cl.³ E21B *15/00*; E21C *5/06*
U.S. Cl. 173—147 **10 Claims**

1. In a drilling machine for drilling holes in earth and rock having a tower, a drilling head, a first guide means for guiding said drilling head for vertical movement along a predefined path with respect to said tower, and drill means attached to said drilling head for drilling holes, feed means for effecting said vertical movement of said drilling head comprising:

a. carriage means arranged for partaking of motion substantially parallel to said predefined path;

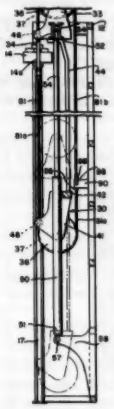
b. an upper wheel and a lower wheel journaled for rotation in said carriage means, each wheel having a second guide means formed in the periphery thereof for engaging and guiding a flexible segment, said upper and lower wheels arranged so that their respective said second guide means are coplanar;

c. at least one flexible segment joined to form a continuous unitary loop disposed about a portion of the periphery of each of said upper and lower wheels and in guiding engagement with said second guide means thereof;

d. anchor means located approximately midway on said tower for rendering a first portion of said at least one flexible segment stationary and immovable with respect to said tower;

e. coupling means for attaching a second portion of said at least one flexible segment to said drilling head;

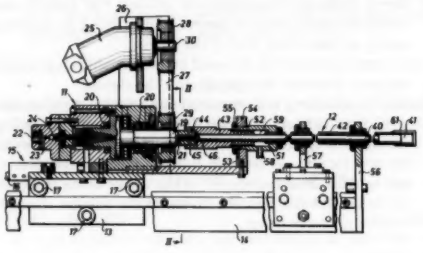
f. actuator means interposed between the bottom of said tower and said carriage means for (a) imparting said motion to said carriage means whereby said continuous unitary loop tracks about the periphery of said upper and lower wheels thereby forceably imparting said vertical movement in both directions along said predefined path to said drilling head, and (b) removing all drawdown and lifting forces from the top half of said tower.



4,503,918
ROCK DRILLING APPARATUS

Hans Bergkvist, Ecublens, and Hans Jaun, la Conversion, both of Switzerland, assignors to Institut Cerac S.A., Ecublens, Switzerland

Filed Jun. 16, 1983, Ser. No. 504,988
Claims priority, application Sweden, Jun. 22, 1982, 8203865
Int. Cl.³ E21B *44/00*; E21C *5/10*
U.S. Cl. 175—27 **10 Claims**



1. A rock drilling apparatus for drilling holes by means of a high pressure hydraulic jet including a rock drill body **(11)**, a drilling tool **(12)** attached to said rock drill body **(11)**, and a feeding device **(15)** including a motor **(16)** for moving said body and tool to and from a working face, said drilling tool **(12)** comprising an inner rotating tube **(40)** provided with a high pressure nozzle body **(41)** at the nose thereof and an outer tube **(42)** surrounding said inner tube **(40)**, said rock drill body **(11)** being provided with means **(19, 22, 23)** for supplying high pressure hydraulics to said nozzle body **(41)** and a rotating mechanism **(25,27)** for rotating said inner tube **(40)**, characterized by a sensing device **(73)** for sensing the resistance met by said outer tube **(42)** while moving to said working face and

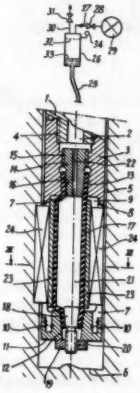
effective to cause said motor (16) to retract said drill body (11) and tool (12) from said working face when a preset value of said resistance is exceeded; said sensing device comprising relay means (83) effective to maintain said drill body and said tool in the retracted position for a preselected interval and to cause said motor to move said drill body and said tool to said working phase upon the expiration of said preselected interval.

4,503,919

BORING DEVICES

Joseph P. Suied, 191 rue d'Alésia, 75 014 Paris, France

Filed Feb. 11, 1983, Ser. No. 465,780
Claims priority, application France, Feb. 11, 1982, 82 02224
Int. Cl.³ E21B *10/32*
U.S. Cl. 175—269 **10 Claims**



1. A boring device comprising a tool structure having a substantially cylindrical stage, capable of being easily introduced in and extracted from a hole and including cutting elements capable of being displaced between a retracted position within the cylindrical surface of the tool structure and a projecting position in which projecting position rotation of the tool structure cuts a groove by means of the cutting elements, driving means for shifting the cutting elements from the retracted position to the projecting position and vice versa, said driving means comprising a radially expansible fluidtight diaphragm which is coaxial with the tool structure and which defines a closed expansion chamber, the cutting elements being disposed on the diaphragm, a source of liquid under pressure, means for putting said liquid under pressure, and conduit means for putting the closed expansion chamber defined by the diaphragm in communication with said source of liquid, said conduit means terminating at the closed expansion chamber formed by said fluidtight diaphragm so that liquid from said source is prevented from flowing into the hole in which the boring device is introduced.

4,503,920

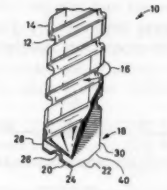
MASONRY BIT

Burke Clement, 7823 Gleason Rd., Westview Towers, Apt. 1214, Knoxville, Tenn. 37919

Continuation-in-part of Ser. No. 291,640, Aug. 10, 1981, Pat. No. 4,400,119. This application Sep. 30, 1982, Ser. No. 430,890
Int. Cl.³ E21B *10/44*
U.S. Cl. 175—394 **5 Claims**

1. An improved masonry drill bit of the type wherein a transverse cutting bar is carried on an outer end of a shank and said shank is provided with at least one spiral flute, said cutter bar having a first and a further surface joined at a chisel edge on the axis of said shank, said first and further surface each having a cutting edge and a trailing edge, wherein the improvement comprises:

providing in said first surface a groove extending from said cutting edge to said trailing edge, the width and depth of said groove at said trailing edge being at least equal to the width and depth of said groove at said cutting edge; and



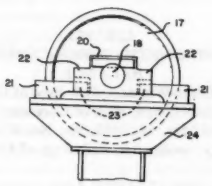
dividing said further surface into an inner radial portion and an outer radial portion, said outer radial portion beginning at a dimension equivalent to substantially that of a radial outer edge of said groove in said first surface, said outer radial portion forming an angle with respect to said axis of said shaft less than an angle of said inner radial portion with said axis.

4,503,921

WEIGHING SYSTEM

Karl L. Polen, and Edward S. Scott, both of Alliance, Ohio, assignors to The Alliance Machine Company, Alliance, Ohio

Filed Sep. 6, 1983, Ser. No. 529,556
Int. Cl.³ G01G *19/14*; B66C *1/40*
U.S. Cl. 177—147 **5 Claims**



1. A weighing system comprising a support frame, an upper sheave assembly on said support frame having at least one sheave, a sheave pin on which said at least one sheave rotates, a fixed load block supporting one end of said sheave pin, locking means fixing said one end of said sheave pin in said fixed load block, a pivot load block pivotally supporting the other end of said sheave pin, a first pair of shear beam load cells fixed at one end to the support frame and pivotally connected at the other end to the fixed load block, a second pair of shear beam load cells fixed at one end to the support frame spaced from said first set and pivotally connected at the other end to said pivot load block whereby said one end of the sheave pin is fixedly supported and the other end is pivotally supported.

4,503,922

ELECTRONIC BATHROOM SCALE APPARATUS USING PLANAR COIL SENSORS

Amnon Brosh, Montvale, N.J., and David Fiori, Jr., Yardley, Pa., assignors to Bitronics, Inc., Montvale, N.J.

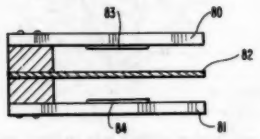
Filed May 26, 1983, Ser. No. 498,536
Int. Cl.³ G01G *3/14, 3/16*
U.S. Cl. 177—210 EM **14 Claims**

1. Transducer apparatus for providing an electrical output signal indicative of the movement of a platform as included in a weighing scale, said platform mechanically coupled to a

lever means, which lever means provides a vertical movement in accordance with the amount of weight placed on the platform, in conjunction therewith,

a first planar board positioned beneath said platform and relatively parallel thereto, said board having deposited on a surface at least one planar coil configuration

a second planar member pivotally coupled to said planar board at one end and adapted when pivoted to move towards or away from said first planar board, said other end of said planar member coupled to said lever means,



whereby said member moves with respect to said first planar board in accordance with said vertical movement, a third planar board positioned parallel to said first board and located beneath said planar member, said third board having deposited on a surface at least one planar coil of a configuration similar to that on said first board whereby said planar member as coupled to said lever means can move towards or away from said first or third boards, and

circuit means coupled to said planar coil to provide an electrical output signal which varies according to the movement of said first planar board with respect to said first.

4,503,923

ELECTROMAGNETIC FORCE-COMPENSATING BALANCE

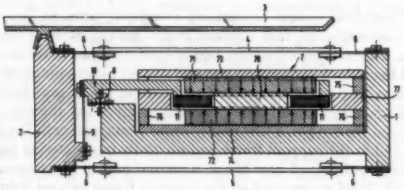
Günther Maaz, Uslar-Wiensen, Fed. Rep. of Germany, assignor to Sartorius GmbH, Fed. Rep. of Germany

Filed Mar. 11, 1983, Ser. No. 474,282

Claims priority, application Fed. Rep. of Germany, Mar. 26, 1982, 3211163

Int. Cl.³ G01G *3/15, 7/00*

U.S. Cl. 177—212 **9 Claims**



1. In a balance based on the principle of the electromagnetic compensation of force, comprising: at least one annular carrier coil having vertical axis, located in an air gap of a permanent essentially symmetrical magnet system positioned in a central plane of the carrier coil perpendicular to the vertical axis two disks of active magnetic material with vertical direction of magnetization above and below the central plane, whereby the like poles of these disks face each other so that a horizontal, radially running magnetic field is formed in the air gap in which the carrier coil is located, so that a vertical force is exerted on the carrier coil during current flux, the inside diameter of the carrier coil is smaller than the greatest diagonal of the disks of active magnetic material.

4,503,924

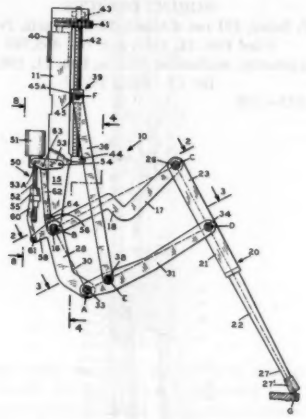
HORIZONTAL ACTUATOR MECHANISM FOR THE LEGS OF A WALKING MACHINE

Stephen J. Bartholet, Orange, and Armen H. Sivaslian, Newport Beach, both of Calif., assignors to Odetics, Inc., Anaheim, Calif.

Filed Mar. 18, 1983, Ser. No. 476,566

Int. Cl.³ B62D *57/02*

U.S. Cl. 180—8.6 **9 Claims**



1. A leg mechanism and horizontal actuator therefor comprising:

a frame member;

a first elongate link, a first end of said first link being pivotally connected to said frame member;

a second link, a first end of said second link being pivotally connected to a second end of said first link, the second end of said second link forming a foot;

a third link, a first end of said third link being pivotally connected to said frame member and said first end of said first link;

a fourth link, a first end of said fourth link being pivotally connected to the second end of said third link, the second end of said fourth link being pivotally connected to an intermediate point on said second link;

vertical actuator means operatively connected to said fourth link; and

horizontal actuator means operatively connected between said first and third links.

4,503,925

DETACHABLE STEERABLE POWER UNIT FOR OCCUPANT-PROPELLED WHEELCHAIRS

James A. Palmer, Saginaw, and Stephen C. Gromak, Auburn, both of Mich., assignors to Amigo Sales, Inc., Bridgeport, Mich.

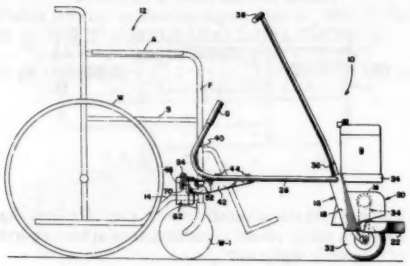
Filed Jun. 13, 1983, Ser. No. 503,524

Int. Cl.³ A61G *5/04;* **B60K** *1/00*

U.S. Cl. 180—13 **14 Claims**

1. In a steerable power drive unit adapted to be detachably coupled to a conventional, occupant-propelled, wheelchair having a pair of spaced frame portions adjacent the front of said chair at opposite sides thereof; said power drive unit having a main frame, a steerable ground engaging wheel operatively mounted in said main frame, power drive means for driving said wheel in rotation, and coupling means for detachably coupling said unit to said chair; the improvement wherein said coupling means comprises a pair of coupling pins, mounting means for mounting said pins upon the respective aforementioned frame portions of a wheelchair to locate said pins in

laterally coaxial horizontal alignment with each other at opposite sides of the chair, a pair of longitudinally extending side frame members fixedly mounted at their forward ends upon said main frame of said power unit and projecting rearwardly therefrom, handle means projecting upwardly from the rearward end of each of said side frame members, means defining



a downwardly opening pin receiving recess on each side frame member adjacent the rearward end thereof, and releasable latch means on each side frame member movable from a retracted position clear of the recess on said member to a latching position extending across the lower end of said recess wherein said latch means is operable to retain one of said coupling pins within the recess.

4,503,926

DRIVE AGGREGATE

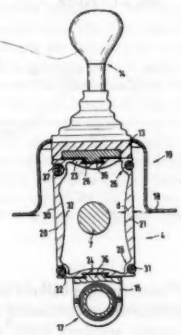
Rolf von Sivers, Rutesheim, Fed. Rep. of Germany, assignor to Dr. Ing. H. C. F. Porsche Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Nov. 23, 1982, Ser. No. 443,870

Claims priority, application Fed. Rep. of Germany, Nov. 28, 1981, 3147298

Int. Cl.³ B60K *5/02*

U.S. Cl. 180—75.2 **12 Claims**



1. A drive aggregate for a motor vehicle, comprising an internal combustion engine having a separating clutch and a transmission unit, the internal combustion engine together with the separating clutch being arranged in the front area of the vehicle and the transmission unit in the rear thereof, and the internal combustion engine together with the separating clutch as well as the transmission unit forming an overall aggregate under interposition of a hollow connecting bearer means, the connecting bearer means is provided along its walls with retaining means arranged on the outside thereof and the walls are constructed in such a manner that a connecting bearer means is formed having at least essentially the same resistance moment in its main axes with at least approximately the same resonant frequencies of the overall aggregate, the thickness of the walls of the connecting bearer means decreases essentially uniformly in the direction toward a corner, and

at least one of inner and outer surfaces of the walls of the connecting bearer means are arcuately shaped between corners thereof, whereby the greatest thickness of each wall lies essentially in the main axes.

4,503,927

HYDRAULIC CONTROL SYSTEM FOR FOUR-WHEEL DRIVE TRANSFER MECHANISM FOR VEHICLES

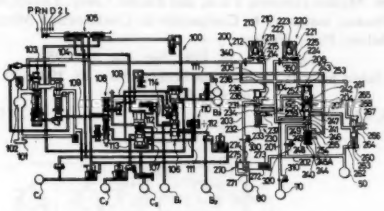
Yoichi Hayakawa, Toyoake, and Yasunobu Ito, Aichi, both of Japan, assignors to Aisin Warner Kabushiki Kaisha, Anjo, Japan

Filed Sep. 29, 1982, Ser. No. 427,026

Claims priority, application Japan, Sep. 30, 1981, 56-156430

Int. Cl.³ B60K *17/34*

U.S. Cl. 180—247 **5 Claims**



1. In a hydraulic control system for four-wheel drive transfer mechanism for vehicles, having a two-wheel drive direct-coupling speed range, a four-wheel drive direct-coupling speed range and a reduced-speed four-wheel drive speed range, the improvement comprising:

an internal combustion engine;

an automaic transmission connected to the output end of said engine;

a transfer mechanism comprising a reduction gear mechanism having an input shaft connected to the output end of said transmission, a first output shaft connected to the output end of said reduction gear mechanism, a second output shaft connected so as to be engaged with said first output shaft through a linkage and first frictional engagement means for shifting said transfer mechanism into a four-wheel drive range, second frictional engagement means for connecting the input shaft of said reduction gear mechanism and said first output shaft for shifting said reduction gear mechanism into a direct-coupling drive range, and third frictional engagement means for shifting said reduction gear mechanism into a reduced-speed drive range; and

a hydraulic control circuit comprising a hydraulic fluid source for supplying a pressurized fluid of a line pressure having a pressure component commensurate with the throttle opening of said engine; means for generating pressure signals corresponding to said drive range of the transfer mechanism, by operating manual shift means for said transfer mechanism; a first control valve means for selectively supplying said pressurized fluid to a hydraulic servomotor of said first frictional engagement means upon reception of a first pressure signal corresponding to the four-wheel drive range of said transfer mechanism, a second control valve means for selectively supplying said pressurized fluid to a servomotor of said second frictional engagement means, draining a servomotor of said third frictional engagement means upon receipt of a second pressure signal corresponding to the direct-coupling drive range of said reduction gear mechanism, selectively supplying said pressurized fluid to the servomotor of said third frictional engagement means, and draining the servomotor of said frictional engagement means upon reception

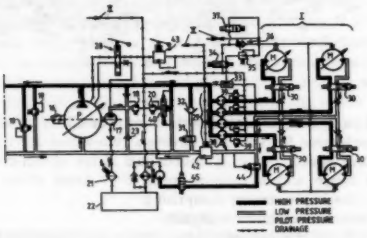
of a third pressure signal corresponding to said reduction-speed drive range; and a third control valve means for controlling the area of a drain port communicating with the servomotor of said second frictional engagement means through a drain passage upon reception of said pressurized fluid of the line pressure; whereby said third control valve means provides a larger port area for said drain passage when said third pressure signal is applied to said second control valve means and said line pressure is lower than a predetermined level and whereas said third control valve means provides a smaller port area for said drain passage when said third pressure signal is applied to said second control valve means and said line pressure is higher than said predetermined level.

4,503,928

HYDRAULIC MOTOR AND HYDROSTATIC POWER TRANSMISSION USING SUCH MOTOR

José Mallen-Herrero, Paris, and Daniel Leroy, Limay, both of France, assignors to Compagnie de Construction Mecanique Sulzer, Paris, France

Filed Nov. 30, 1981, Ser. No. 326,095
Claims priority, application France, Nov. 28, 1980, 80 25332
Int. Cl.³ B60K *17/10*
U.S. Cl. 180—308 **19 Claims**



1. A hydrulic motor usable with a hydrostatic power transmission applied to underground or aerial rolling stock, both on rails and roads comprising

a stator having a continuous bottom surface with recesses,

a rotor having lodgings therein,

vanes axially slidable in said rotor lodgings against said continuous bottom surface,

said stator having movable elements forming said recesses,

means to deliver a constant pilot pressure behind said stator movable elements to reduce the capacity of the motor,

means to produce an active pressure increased by the resisting torque of a load between said rotor and said movable elements of said stator whereby the force of the active pressure will overcome the force of the pilot pressure to increase the capacity of the motor including said vanes and said movable elements with motor capacity determined by the depth of said recesses,

the motor being self-regulated of variable capacity working at constant pressure through variations of its capacity.

4,503,929

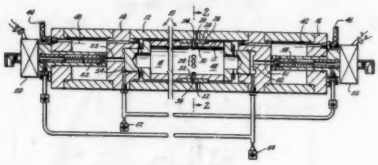
SLEEVE VALVE FOR AN AIR GUN HAVING A RECIPROCATING SHUTTLE VALVE

Richard C. Farris, Dickinson, and Mario J. Diaz, Houston, both of Tex., assignors to Litton Resources Systems, Inc., Alvin, Tex.

Filed Mar. 18, 1982, Ser. No. 359,343
Int. Cl.³ G01V *1/06, 1/38*
U.S. Cl. 181—118 **4 Claims**

1. An air gun of the reciprocating shuttle type for underwater signalling, the gun having a housing defining a firing chamber for receiving a volume of compressed air, a reciprocable shuttle valve slidingly mounted in said firing chamber, means at each of opposite ends of said firing chamber for reciprocating said shuttle valve back and forth in alternate linear strokes, the firing chamber defining at least one set of radially-positioned air exhaust ports, said shuttle valve comprising:

a shuttle body defining at least one set of radially-positioned air release ports;



at least one split sleeve valve, defining a set of orifices alignable with the air release ports, encircling at least a portion of the shuttle body; and

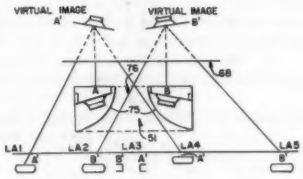
means for floatingly retaining said split sleeve valve at a desired position relative to the shuttle body.

4,503,930

LOUDSPEAKER SYSTEM

Vaughn P. McDowell, Rte. 2, Box 475, Fredericksburg, Va. 22405

Filed Sep. 3, 1982, Ser. No. 414,662
Int. Cl.³ H05K *5/00*
U.S. Cl. 181—145 **5 Claims**



1. A loudspeaker comprising a cabinet providing an enclosure for an upper compartment containing at least two arrays of at least two acoustic speakers each, the corresponding speakers of each array being essentially at the same level within said compartment and positioned generally vertically relative to each other in their respective arrays and arranged to project sound from said enclosure in the same general direction, the arrays being positioned such that the arrays project at a substantial angle relative to each other and are spaced at least one array width from each other, and a vertically-extending portion of the space through the enclosure between the arrays being essentially unbaffled and hence pervious to sound and capable of conducting back through the enclosure sound projected by the speakers and reflected from a reflecting surface that is generally perpendicular to said direction, whereby an aperture freely conducting reflected sound through the cabinet is provided.

4,503,931

NOISE SUPPRESSING, AIR COOLED ENCLOSURE FOR AN ENGINE

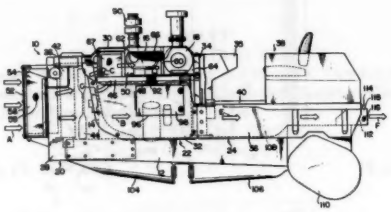
Yutaka Sugimoto; Kenji Taira, and Akira Fukushima, all of Komatsu, Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed May 2, 1983, Ser. No. 490,482

Claims priority, application Japan, May 12, 1982, 57-78308; May 12, 1982, 57-67992[U]; May 12, 1982, 57-67993[U]

Int. Cl.³ F01N *1/24*

U.S. Cl. 181—204 **11 Claims**



1. A noise suppressing, air cooled enclosure mounted on a frame and generally surrounding an internal combustion engine supported thereon, the engine having an exhaust muffler assembly and an air cleaner assembly arranged thereover, the enclosure comprising:

(a) wall means mounted on the frame to define a substantially closed space;

(b) air inlet means at a first end of the wall means for noiselessly admitting cooling air into the closed space;

(c) first air outlet means at a second end of the wall means for noiselessly exhausting the cooling air from the closed space;

(d) a heat insulating partition disposed horizontally within the wall means to divide the closed space defined thereby into an engine compartment accommodating the engine and, thereover, a muffler compartment accommodating the exhaust muffler assembly, the engine compartment being open toward both the first and second ends of the wall means to allow the cooling air to flow therethrough from the air inlet means to the air outlet means for cooling the engine, the muffler compartment being open toward the first end of the wall means to take in part of the cooling air from the air inlet means for cooling the exhuast muffler assembly, said air cleaner assembly being mounted on said partition behind the exhaust muffler assembly with respect to the first end of the wall means; and

(e) second air outlet means in the wall means for exhausting the cooling air from the muffler compartment.

4,503,932

PERSONNEL ELEVATING APPARATUS

Allan R. Hilton, Bolton, England, assignor to Hilton (Products) Limited, Bolton, England

Filed Jan. 5, 1982, Ser. No. 337,185

Claims priority, application United Kingdom, Jan. 7, 1981, 8100362; Aug. 20, 1981, 8125419

Int. Cl.³ E06C *1/393*

U.S. Cl. 182—113 **7 Claims**

1. Personnel elevating apparatus, comprising:

(a) a support platform (**10**) dimensioned wholly to accommodate a person standing thereon to reach an elevated location,

(b) first leg means (**11**) pivoted to one end of the support platform and movable between an out-of-use position where the leg means lie substantially parallel alongside and underneath the support platform and an in-use position where the leg means are disposed substantially normal to and depending from the support platform,

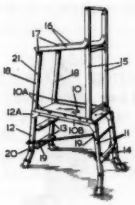
(c) second leg means (**12**) pivoted to the other end of the support platform,

(d) an upright (**18**) extending upwardly from the second leg means at each side of the support platform,

(e) the second leg means and uprights being movable between the out-of-use position where the second leg means lie underneath the support platform and the uprights lie forwardly of the platform, and the in-use position where they are disposed substantially normal to the support platform, the second leg means depending from the platform and the uprights extending above the platform,

(f) step means (**13**) horizontally incorporated in the second leg means whereby a person can climb onto the support platform,

(g) a support frame (**15**) including a top hand rail pivoted to said one end of the support platform and movable between the out-of-use position where it lies substantially parallel



with the upper surface of the support platform and the in-use position where it extends upright from the support platform,

(h) a lateral rail (**16**) at each side of the apparatus pivoted at one end to or adjacent to the end of one of the uprights and at the other end to one side of the support frame nearer the hand rail than the support platform,

(i) the support frame and lateral rails defining a three-sided guard rail means around the sides and said one end of the support platform and the lateral rails being movable between the out-of-use position alongside the uprights and the in-use position normal to the uprights and support frame, and

(j) strut means (**19**) pivoted to the first leg means and adjustable between a position (**20**) where it engages the second leg means to stabilise the apparatus in the in-use position and a position (**21**) where it engages an upright to facilitate collapse of the apparatus to the out-of-use position.

4,503,933

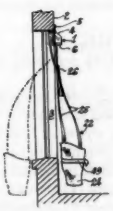
BUILDING EVACUATION DEVICE

Michael J. O'Neil, 16335 Arena Dr., Ramona, Calif. 92065

Filed Dec. 30, 1983, Ser. No. 567,404

Int. Cl.³ A62B *1/08*

U.S. Cl. 182—231 **10 Claims**



1. An apparatus allowing its user to safely control his escape

and descent from an upper floor window or the like, which comprises:

a reel;

a first line coiled from one end on the reel;

means for attaching the other end of said line to the user's body;

a coaster-type brake installed in the hub of said reel;

means for resiliently applying said brake against the line-unrolling movement of the reel;

a hand-operated means for releasing the brake; and

means for keeping said hand operated means accessible to the user during said descent.

4,503,934

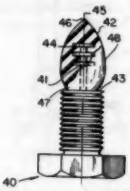
DRAIN PLUG WITH DISENGAGEMENT SEALING MEANS

Tony L. Stephanus, 2741 E. South St., Columbus, Ind. 47201, and Donald J. Stephanus, R.R. 1, Lexington, Ind. 47138

Filed Apr. 11, 1983, Ser. No. 483,582

Int. Cl.³ F16N *33/00*; F16K *5/02*

U.S. Cl. 184—1.5 **1 Claim**



1. A plug mountable to an internally threaded hole comprising:

a main body with a tool engageable head and a shank integrally connected together, said shank having external threads thereon and a longitudinal axis extending centrally therethrough;

a gasket mounted to an end of said shank farthest from said head and sized to sealingly engage said internally threaded hole as said external threads are disengaged therefrom limiting drainage through said hole until said main body is pulled in the direction of said axis disengaging said gasket from said hole;

a post mounted to said of said shank and extending away therefrom in the direction of said axis, said post providing a mount for said gasket, said post includes arms extending outwardly in a direction other than said axis to secure said gasket thereon.

4,503,935

LIFT JACK RETENTION BRACKET

John J. Haffer, Euclid, and Alan T. Fredrick, Mentor, both of Ohio, assignors to Towmotor Corporation, Mentor, Ohio

Filed Mar. 15, 1982, Ser. No. 357,945

Int. Cl.³ B66B *9/20*

U.S. Cl. 187—9 E **4 Claims**

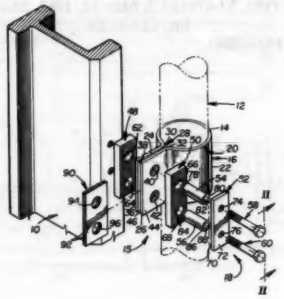
1. A lift mast (104) adapted for mounting on a lift truck (100) comprising

a statutory upright (114),

a movable upright (116), movably mounted on said stationary upright (114),

at least one lift jack (12) interconnected between said stationary upright (114) and said movable upright (116), said lift jack (12) having a cylinder (158) and an extensible rod (166) reciprocally mounted in said cylinder (158), and

means (16,18) for resiliently mounting said cylinder (158) on said stationary upright (114) to allow said cylinder (158) to move slightly relative to said stationary upright (114) in response to the imposition of a moment on an upper end of said movable upright (116), said means (16,18) including a unitary bracket member (20) attached between said cylinder (152) and said stationary upright (114), said bracket member (20) including a cylindrical portion (22) clamped about the upper end of said cylinder (158) and a pair of overlying flanges (14,26) extending radially outwardly from said cylindrical portion (22) and positioned in close



proximity to said stationary upright (114), at least one elastomeric bushing (48) disposed and compressed between said flanges (24,26) and said stationary upright (114) and bolt means (58,60) extending through said flanges (24,126) and said bushing (48) for releasably attaching them to said stationary upright (114).

4,503,936

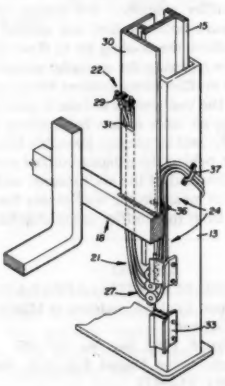
HYDRAULIC HOSE MOUNTING ARRANGEMENT FOR HIGH-VISIBILITY MAST ASSEMBLY

Bradley A. Rice, Salem, Oreg., assignor to Towmotor Corporation, Mentor, Ohio

Filed Oct. 4, 1982, Ser. No. 432,584

Int. Cl.³ B66B *9/20*

U.S. Cl. 187—9 R **15 Claims**



1. In a mast assembly (11) having a fixed upright assembly (12), including a pair of laterally spaced outer uprights (13), a movable upright assembly (14) slidably mounted on said fixed upright assembly (12) and including a pair of laterally spaced inner uprights (15), a carriage assembly (18) slidably mounted on said movable upright assembly (14), and a plurality of flexible hoses (21) attached between said fixed upright assembly (12) and said carriage assembly (18), the improvement comprising:

a routing arrangement (24) wherein said hoses (21) each define a loop portion (25) positioned adjacent to a lower

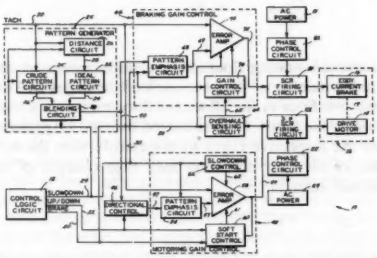
end (26) of at least one inner upright (15) of said movable upright assembly (14) and means (27) for mounting and guiding the loop portions (25) of said hoses (21) on said inner upright (15) in vertically spaced and closely compacted relationship relative to each other and for permitting movement of said movable upright assembly (14) relative to said hoses (21), said means (27) including at least first (28*a*) and second (28*b*) sheaves rotatably mounted in vertically spaced relationship on the lower end (26) of said inner upright (15), a first loop portion (25*a*) of said loop portions (25) entrained under said first sheave (28*a*) and a second loop portion (25*b*) thereof entrained under said second sheave (28*b*).

4,503,937

ELEVATOR CONTROL CIRCUIT

Stephen W. Cervenec, Perrysburg, and Ronald L. Stender, Maumee, both of Ohio, assignors to Schindler Haughton Elevator Corporation, Toledo, Ohio

Filed Dec. 1, 1982, Ser. No. 445,897
Int. Cl.³ B66B *1/32*
U.S. Cl. 187—29 R **18 Claims**



1. In an elevator system including a drive motor coupled to control the position of an associated elevator car, a control circuit comprising:

means for generating a tach signal representing the actual speed of the car;

means for generating a pattern signal representing the desired speed of the car, said pattern signal including a deceleration portion, said means for generating a pattern signal being responsive to the tach signal for setting the initial level of the deceleration portion of said pattern signal at a value which is a function of the level of the tach signal; and

means responsive to the tach signal and the pattern signal for controlling the drive motor.

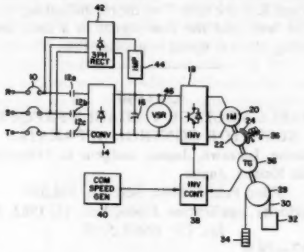
4,503,938

AC ELEVATOR CONTROL SYSTEM

Masami Nomura, Nagoya, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 27, 1983, Ser. No. 509,011
Claims priority, application Japan, Jul. 6, 1982, 57-117252
Int. Cl.³ B66B *1/06*
U.S. Cl. 187—29 R **8 Claims**

1. An AC elevator control system comprising a converter for converting a commercial AC power from a commerical AC source to a direct current, a smoothing capacitor for smoothing said direct current from said converter, an inverter for inverting said smoothed current to an AC power at a variable frequency, and an AC motor receiving said AC power from said inverter to travel an elevator car wherein there are provided contact pairs connected between said commercial AC source and said converter to be closed for the start of said elevator car, means including a rectifier connected between junctions of said commerical AC source and said contact pairs and said smoothing capacitor to rectify said commerical AC power from said commerical AC source and supply a rectified voltage to said smoothing capacitor, and a voltage sensor device connected across said smoothing capacitor to sense a



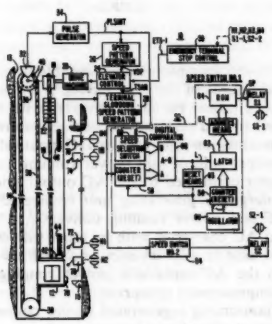
voltage thereacross and prevent the closure of said contact pairs for the start of said elevator car in response to the sensed voltage of not higher than a predetermined magnitude.

4,503,939

ELEVATOR SYSTEM

Fitzroy L. Lawrence, East Orange, and Pantelis G. Tinios, Mt. Arlington, both of N.J., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 19, 1983, Ser. No. 524,811
Int. Cl.³ B66B *1/30*
U.S. Cl. 187—29 R **11 Claims**



1. A speed switch for determining the speed of an elevator car relative to a predetermined speed V, comprising:

an oscillator having a predetermined fixed frequency F,

a first counter disposed to provide a first count responsive to F,

a latch for latching the first count in reponse to a latch signal L,

a memory,

means for addressing said memory with the latched first count,

said memory being programmed to output a first signal when addressed by a count value which is below a predetermined value C, and to otherwise output a second signal,

means providing distance pulses at a rate of P pulses per inch of movement of the elevator car,

a second counter disposed to provide a second count responsive to said distance pulses,

reference means for providing a reference count R which is a function of V, P and the time T for the first counter to count to C,

comparator means for providing a latch signal L for said latch each time the second count and the reference count R have a predetermined relationship,

and reset means responsive to each latch signal L for resetting said first and second counters,

whereby said memory outputs the second signal when the second count reaches the predetermined relationship with the count R in the time T or more, indicating the car speed is V or less, and the first signal in a time less than T, indicating the car speed is greater than V.

4,503,940

VARIABLE-VOLTAGE VARIABLE-FREQUENCY ELEVATOR CONTROL APPARATUS

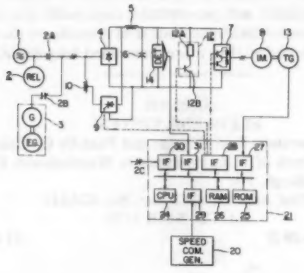
Eiki Watanabe, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Feb. 3, 1984, Ser. No. 576,557

Claims priority, application Japan, Feb. 16, 1983, 58-23965

Int. Cl.³ B66B *5/02*

U.S. Cl. 187—29 R **10 Claims**



1. An improved variable-voltage variable-frequency elevator control apparatus of the type having a 3-phase AC main power source, a power running converter with its AC input side connected to said main power source, an inverter of the pulse width modulation type with its DC input side connected to the DC output side of said power running converter, an induction motor connected to the AC output side of said inverter, an emergency generating unit connected to the AC input side of said power running converter, a regenerated power DC to AC converter with its input side connected to the DC input side of said inverter and with its output side connected to the AC input side power running converter, wherein the improvement comprises:

means for consuming regenerated power connected across the DC input side of said inverter; and

control means for turning said means for consuming regenerated power on during emergency regenerative braking and off at other times and for turning said regenerated power converter on during normal regenerative braking and off and blocking the transmission of DC power from the DC input side of the regenerated power converter to its AC output side at other times, said control means turning said means for consuming regenerated power on and turning said regenerated power converter off instantaneously at the same time responsive to detecting abnormalities in the power from said power source and shifting to the emergency generating unit, and a regenerative braking condition.

4,503,941

SUPERVISORY APPARATUS FOR ELEVATORS

Katsunori Takabe, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Feb. 8, 1984, Ser. No. 578,264

Claims priority, application Japan, Feb. 15, 1983, 58-23019

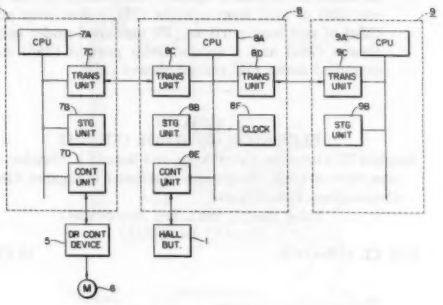
Int. Cl.³ B66B *1/18*

U.S. Cl. 187—29 R **10 Claims**

1. A supervisory apparatus for elevators wherein cages are respectively caused to disperse and wait at predetermined floors during an inactive elevator operation during which a demand for the cages has decreased, comprising:

(a) means to measure traffic volumes of the cages,

(b) demand magnitude estimation means to estimate the demand magnitudes from the measured traffic volumes for respective floors in each of a predetermined number of time zones into which one day is divided; and



(c) dispersed waiting floor determination means to allot a suitable number of floors to each of the cages and determine one floor in the allotment floor region as a waiting floor on the basis of the estimated demand magnitudes so that the respective cages to dispersedly wait during the inactive elevator operation may take charges of equal demand magnitudes.

4,503,942

DEVICE FOR GUIDING A SUBMERSIBLE PUMP UNIT

Bengt Andén, Spånga; Bengt Ramström, Lungsangen, and Bengt Södergard, Upplands Väsby, all of Sweden, assignors to ITT Industries, Inc., New York, N.Y.

Filed Oct. 21, 1982, Ser. No. 435,783

Claims priority, application Sweden, Nov. 30, 1981, 8107116

Int. Cl.³ B66B *7/02*

U.S. Cl. 187—95 **6 Claims**

1. A device for guiding a submersible pump unit in a vertical direction to and from its operation position, comprising:

a thin vertically disposed guide member;

a lower guide member portion disposed at a lower end of the guide member and having a gradually increasing width;

a tilted guide member portion connected to the upper end of the guide member; and

guide means provided on the pump unit and arranged to slide along the guide member and the lower guide member

when the pump unit is moved, the guide means being provided with two legs, vertically displaced in relation to each other and facing each other with a certain overlap.

4,503,943

CASTER WITH A STOPPER

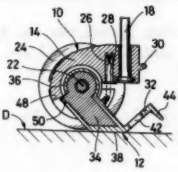
Motoichi Tsukui, No. 3-6, Nishi-Mizue, Edogawa-ku, Tokyo, Japan

Filed Dec. 2, 1982, Ser. No. 446,430

Claims priority, application Japan, Dec. 5, 1981, 56-181405[U]

Int. Cl.³ B60T *1/14*

U.S. Cl. 188—5 **9 Claims**



9. A caster comprising a basic body part turnable at one end thereof and provided at its opposite end with spaced apart axle supports for receiving an axle on which wheels are rotatably mounted on the opposite sides of said axle supports thereby to position the wheels in a direction transverse to the moving direction thereof, a stopper part comprising a bearing portion at one end of the stopper part and mounted on the axle between the axle supports for pivotal movement relative to said basic body part, one of said body and stopper parts having a recess therein and the other part a projection therefrom, at least a part of said bearing portion being formed of a strengthening steel material; an oblique grounding surface provided on said stopper part at an end opposite to said bearing portion, said grounding surface being flat for substantial surface contact with the earth on downward pivotal movement of the bearing portion about the axle, an engaging means forming an extension of the grounding surface for setting the stopper part above the lower margin of the wheels on upward pivotal movement of the bearing portion about the axle; a spring accommodated at an end portion thereof in said recess and its other end by said projection for compressing the spring within the recess when the stopper part is set above the lower margin of the wheels and for urging the stopper part downward and releasing the engaging means; and a swing limiting means adjacent to the bearing portion for limiting the range of the pivotal movement of the stopper part about said axle.

4,503,944

DEVICE FOR COOLING MOTOR VEHICLE WHEELS

Manfred Burckhardt, Waiblingen, and Herbert Schulte, Leutenbach-Nellmersbach, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

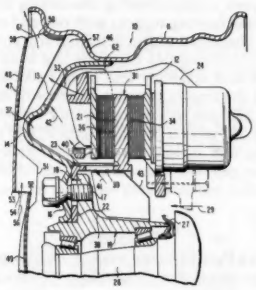
Filed May 20, 1982, Ser. No. 380,405

Claims priority, application Fed. Rep. of Germany, May 20, 1981, 3120021

Int. Cl.³ F16D *65/847*; B60B *9/10*

U.S. Cl. 188—71.6 **12 Claims**

1. A cooling device for a motor vehicle wheel equipped with a disc brake means mounted between a wheel center and a brake cover plate means, the cooling device including a pot-shaped mounting means for securing a rotor means of the disc brake means to a wheel flange of a hub of the wheel, the pot-shaped mounting means defining an inner annular space opening in the direction of the cover plate means, opening means provided in the cover plate means arranged within a cross section of the inner annular space of the pot-shaped mounting means for enabling a cooling air stream to enter the inner annular space, further opening means provided in the wheel center in an area near a rim of the wheel for enabling the cooling air stream to escape from an outer annular space between the disc brake means and the wheel center, said pot-shaped mounting means including a jacket portion for delimiting an inner hub side of the outer annular space, a plurality of additional opening means being arranged about a circumference of the jacket portion for communicating the inner and outer annular spaces, axially/radially effective fan means provided on the hub of the wheel in the inner annular space de-



fined by the pot-shaped mounting means, the fan means being adapted to force a component of the cooling air stream entering a space between the brake and cover plate means into the outer annular space between the disc brake means and the wheel center, thereby providing, in a defined ratio, distribution of the cooling air stream into partial air streams, one of which flows along an inner surface of the rotor means and another of which flows along an outer surface of the rotor means to the opening means in the wheel center arranged in the area near the rim of the wheel.

4,503,945

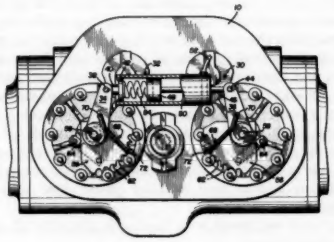
FAILSAFE BRAKE ACTUATING ASSEMBLY

Paul R. Schuck, Davenport, Iowa, assignor to J. I. Case Company, Racine, Wis.

Filed Aug. 1, 1983, Ser. No. 519,000

Int. Cl.³ F16D *65/58*

U.S. Cl. 188—71.8 **1 Claim**



1. A brake actuating assembly for the transmission brakes of a crawler-type tractor, said assembly including:

a brake actuating cylinder pivotally connected to one end of a brake actuating arm for rotating said actuating arm in opposite directions, said actuating cylinder connected to a source of fluid pressure and including a piston which is movable in a first direction against a spring means in response to the presence of fluid pressure from said source, and said piston movable by said spring means in a second opposite direction in response to the absence of fluid pressure from said source;

an adjustment member connected to a rotatable brake cam for operating said transmission brakes, said adjustment member including a first bearing support for rotatably mounting said brake actuating arm thereby permitting said actuating arm to rotate freely relative to said adjustment member, said brake cam being rotatable about an axis that is colinear with the axis of said first bearing support, and said adjustment member including a plurality of peripheral teeth members;

said actuating arm including a second bearing support, the axis of which being eccentric to the axis of said first bearing support, a torsion spring connecting link mounted on said second bearing support with one end of said connecting link connected to said actuating arm and the other end of said connecting link engaging said teeth members; and

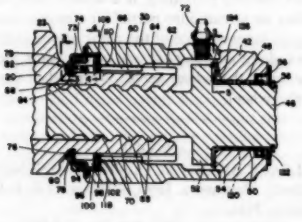
rotation of said actuating arm in said second direction increasing the tension between the ends of said spring connecting link due to the eccentricity between the axes of said first and second bearing supports, and rotation of said actuating arm in said first direction generating a small clearance gap between said other end of said spring connecting link and said teeth members for wear adjustment.

4,503,946

BRAKING PISTON FOR A DISC BRAKE

Donald J. Davidson, Troy, and David D. Sheill, Farmington Hills, both of Mich., assignors to Rockwell International Corporation, Pittsburgh, Pa.

Filed Aug. 31, 1983, Ser. No. 528,300
Int. Cl.³ F16D 55/02
U.S. Cl. 188—71.9 **3 Claims**



1. An improved braking piston and housing for a disc brake of the type which includes a disc mounted for rotation about an axle, said brake housing mounted on said axle in alignment with a friction surface of said disc, said housing having a piston receiving bore therein, said braking piston having an interior end at least partially mounted within said housing and an external end outwardly of said housing adjacent said friction surface of said disc, brake actuation means mounted on said housing, a power shaft mounted within said housing in coaxial alignment with said braking piston and capable of selective rotation by said brake actuation means, and said powershaft having worm gear teeth thereon engaged with mating teeth on said interior end of said braking piston, said improvement comprising:

said piston receiving bore having a plurality of axially extending splines;

said braking piston having a plurality of axially extending splines about an exterior surface of said interior end to mate with corresponding splines on an interior surface of said housing to limit rotation of said braking piston relative to said housing;

said piston further including a circumferential groove in said exterior surface of said braking piston, said circumferential groove having a first radial wall at a terminal end of said axially extending splines toward said disc and a second wall axially separated from said first wall, a ring element mounted in said circumferential groove having a first side against said first radial wall and a second side separated from said second radial wall of said circumferential groove to define a circumferential channel therebetween, and a flexible boot seal surrounding said interior end of said braking piston and having a first end sealingly secured to said housing and a second end extending into said channel for sealed contact therewith; and

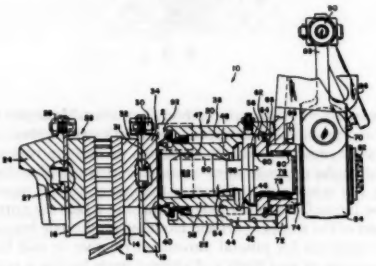
said splines allowing axial movement of said braking piston toward and away from said friction surface of said disc with said axial movement directly corresponding to said selective rotation of said powershaft.

4,503,947

DISC BRAKE AND PROTECTIVE BOOT THEREFOR

Kurt R. Heidmann, Fairview Park, and Andrew Marsh, Elyria, both of Ohio, assignors to Allied Corporation, Morristown, N.J.

Filed Nov. 1, 1982, Ser. No. 438,143
Int. Cl.³ F16D 55/224
U.S. Cl. 188—72.8 **4 Claims**



1. Disc brake comprising a rotor mounted for rotation with a member to be braked and presenting a pair of opposed friction faces, a pair of friction elements mounted adjacent said friction faces for engagement with the friction faces when a brake application is effected, a caliper assembly operatively connected to said friction elements for forcing the latter into frictional engagement with said friction faces, said caliper assembly including a housing, a piston slidably mounted in the housing, actuating means for urging said piston toward and away from said rotor for causing said friction elements to move into and away from frictional engagement with said friction faces, a flexible boot extending between said housing and said piston, said housing, said piston, and said boot each being provided with cooperating means to permit removal of the boot from said housing assembly and said piston without removing said piston from said housing, said cooperating means including a circumferentially extending boot retainer having a first portion engaging said housing and a second portion clamped against said boot, a projecting portion on said housing projecting toward said piston and cooperating with the latter to define a circumferentially extending face, and means holding said first portion of said boot retainer against said face, said holding means including a circumferentially extending member, said first portion being disposed between said face and said circumferentially extending member.

4,503,948

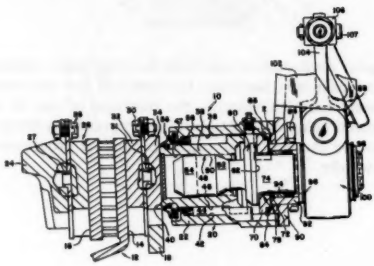
DISC BRAKE THRUST COLLAR ASSEMBLY

Kurt R. Heidmann, Fairview Park, and Donald A. Vorwerk, N. Olmsted, both of Ohio, assignors to Allied Corporation, Morristown, N.J.

Filed Nov. 1, 1982, Ser. No. 438,191
Int. Cl.³ F16D 55/224
U.S. Cl. 188—72.8 **5 Claims**

1. Disc brake assembly comprising a rotor having a pair of friction faces, a pair of friction elements disposed for frictional engagement with said friction faces when a brake application is

effected, a caliper assembly supported adjacent said rotor and engaging each of said friction elements for forcing the latter into braking engagement with their corresponding friction faces when a brake application is effected, said caliper assembly including a housing defining a bore therewithin, force transmitting means operable to cause said friction elements to engage their corresponding friction faces, said bore having an annular wall and transversely extending means defining one end of said bore, said force transmitting means extending through said bore from said transversely extending means, said housing and said force transmitting means include reaction force transfer means for transferring brake reaction forces transmitted through said force transmitting means to said annular wall to substantially relieve said transversely extending



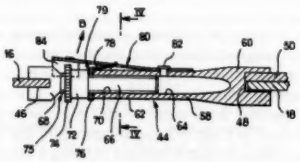
means from said reaction forces, said force transmitting means being an axial expandable mechanical linkage mounted in said bore, said reaction force transfer means including a collar mounted in said bore, means on said force transmitting means for engaging said collar, and means interconnecting the collar and the wall of said bore, said interconnecting means including a groove in said annular wall of said bore and a retaining ring in said groove but projecting from said groove into the wall of said bore to engage said collar, said interconnecting means further including a take-up ring manufactured of deformable material, said take-up ring being carried by said thrust collar and forced against said retaining ring to deform said take-up ring to thereby hold said collar at a predetermined axial position in said housing.

4,503,949

DRUM BRAKE AND THE SPACER FOR SUCH A BRAKE

Jean-Jacques Carré, Le Raincy; Pierre Pressaco, La Courneuve, and Jean-Claude Méry, Pavillons sous Bois, all of France, assignors to Societe Anonyme D.B.A., Paris, France

Filed Nov. 1, 1982, Ser. No. 438,192
Int. Cl.³ F16D *65/56*
U.S. Cl. 188—79.5 P **20 Claims**



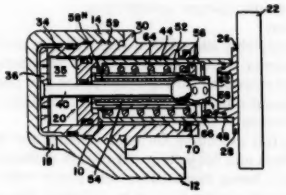
1. A drum brake with automatic adjustment, comprising two shoes lined with friction elements capable of being stressed to engage frictionally against a rotating drum by clamping means located between two first ends of the shoes, a fixed anchoring block located between the other two ends of the shoes, a spacer mounted in the vicinity of the clamping means and bearing at each end on one of said shoes, said spacer comprising a device for automatic lengthening as a function of the wear of the friction elements and formed by a screw/nut system controlled by a pawl stressing a toothing fixed to an element of the screw/nut system, characterized in that said pawl is carried by an elastic blade attached to said spacer, a portion of said blade being held elastically apart from said spacer, with the brake at rest, via a rocking lever mounted on said spacer, said rocking lever enabling, by rocking, said blade and spacer to approach one another when said shoes are stressed apart from one another, the lever being formed by a washer prolongated by an arm forming an angle greater than ninety degrees relative to said washer.

4,503,950

BRAKE ACTUATOR-ADJUSTER MECHANISM

Bruce W. Anderson, Niles, Mich., assignor to Allied Corporation, Morristown, N.J.

Continuation-in-part of Ser. No. 271,453, Jan. 27, 1983, abandoned. This application Jul. 13, 1983, Ser. No. 513,510
Int. Cl.³ F16D *65/38, 55/02, 13/75;* **B21B** *17/02*
U.S. Cl. 188—196 R **6 Claims**



1. In a brake for an aircraft having a plurality of friction discs located between a pressure plate and a backing plate, an actuator mechanism for moving the pressure plate from a rest position toward the backing plate in response to an operational signal and an adjuster mechanism for positioning said actuator mechanism with respect to said backing plate to compensate for wear of the friction disc and thereby maintain a substantially uniform actuation stroke from the rest position, the improvement in the adjuster mechanism comprising:

a tubular member connected to said actuator mechanism, said tubular member having a plurality of openings in a radial plane at selected positions along the axis of the tubular member; and

a stem having a head thereon, said head having a larger diameter than said tubular member, said actuator mechanism responding to an operational signal by overcoming a spring and engaging said tubular member after moving the pressure plate a predetermined distance from an initial rest position, said head thereafter radially expanding said tubular member until the movement of the pressure plate toward the backing plate terminates, said tubular member after being expanded contracting to a substantially uniform neck down diameter in a radial plane through said plurality of openings after the tubular member passes over said head, said spring returning said actuator mechanism to a new rest position with respect to said initial rest position corresponding to the movement of the tubular member and head, said pressure plate and backing plate being expanded by thermal energy generated in the friction disc during a brake application and exerting a thermal force on said actuator mechanism, said pressure plate and friction disc being subjected to inertia forces during various maneuvers of the aircraft in flight, said head engaging said neck down diameter of the tubular member and resisting movement of said actuator mechanism by said thermal forces to assure that the actuator mechanism is located in said new rest position when the thermal forces dissipate as the pressure plate, friction disc and backing plate cools and the inertia forces cease when said maneuvers terminate to assure that the operational movement of the pres-

sure plate from the rest position into engagement with the backing plate is substantially constant.

4,503,951

HYDRAULIC DAMPER HAVING VARIABLE DAMPING DEVICE

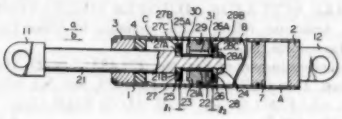
Tomio Imaizumi, Kanagawa, Japan, assignor to Tokico Ltd., Kanagawa, Japan

Filed Jun. 1, 1983, Ser. No. 500,234

Claims priority, application Japan, Jun. 18, 1982, 57-105200

Int. Cl.³ F16F *9/348*

U.S. Cl. 188—280 **5 Claims**



1. A hydraulic damper comprising:

a cylinder;

a piston slidably disposed in said cylinder and partitioning the interior thereof into two liquid chambers;

a passage extending through said piston and connecting said two liquid chambers during both extension and contraction strokes of the damper;

a piston rod extending through at least one of said liquid chambers and projecting out of said cylinder;

said piston being mounted on said piston rod for axial displacement relative thereto by a limited amount; and

means for controlling the amount of liquid flow through said passage during at least one of the extension and contraction strokes of the damper, said controlling means comprising a resilient annular disc mounted on said piston rod, said disc having an outer circumferential portion adapted to be contacted by said piston upon relative movement between said piston rod and said piston during a first portion of the extension or contraction stroke of the damper, means defining a first orifice passage from said passage to one said chamber during said first stroke portion, said disc being deflectable by contact of said piston with said outer circumferential portion during a second portion of the stroke of the damper, a restricting member mounted on said piston rod, said outer circumferential portion abutting said restricting member upon deflection of said disc by a predetermined amount, means defining a radially extending second orifice passage from said passage to said one chamber upon abutment of said outer circumferential portion with said restricting member, and said second orifice passage being of smaller size than said first orifice passage.

4,503,952

ROTARY SHOCK ABSORBER

Hans Hesse, Munich, Fed. Rep. of Germany, assignor to Krauss-Maffei Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Jun. 4, 1982, Ser. No. 384,952

Claims priority, application Fed. Rep. of Germany, Jun. 12, 1981, 3123344

Int. Cl.³ F16F *9/14, 9/30*; F16D *57/02, 65/78*

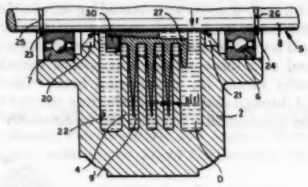
U.S. Cl. 188—306 **2 Claims**

1. A rotary shock absorber comprising:

a nonrotatable member forming a housing and provided with a plurality of spaced apart annular first elements;

a rotatable member mounted for angular oscillation and at least partly received in said housing and connectable to a load adapted to transmit shock, said rotatable member being formed with a plurality of annular second elements interfitting with said first elements whereby said members define a chamber within said housing and said first elements are each juxtaposed with a respective second element to define annular shear gaps therewith within said chamber; and

a body of a dilatant dispersion forming a viscous fluid in said chamber whereby said second elements rotate relatively freely relative to said first elements at low velocity and



angular displacement amplitude but high shear resistance develops in said dispersion between said first and second elements at high velocity, the thickness of one of said elements being stepped to increase progressively inwardly whereby the widths of said gaps increase progressively outwardly.

4,503,953

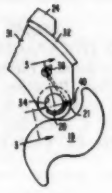
ROLLER RETAINER FOR BRAKE ASSEMBLY

Lawrence M. Majewski, Sterling Heights, Mich., assignor to Rockwell International Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 269,293, Jun. 1, 1982, abandoned. This application Jul. 21, 1983, Ser. No. 515,837

Int. Cl.³ F16D *51/22*; F16F *1/00*

U.S. Cl. 188—330 **6 Claims**



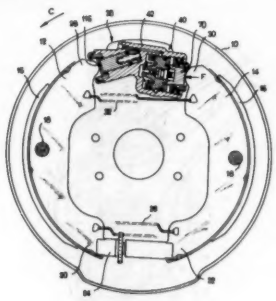
1. A roller retainer for retaining a cam following roller in a pair of laterally aligned open-ended recesses provided at adjacent ends of a pair axially spaced brake shoe webs comprising a length of spring wire formed to provide a pair of spaced substantially parallel legs, each of said legs having an end formed to encircle at least 180° but substantially less than 360° of a trunnion surface of said roller and defining a plane parallel to the other leg, a bridge portion joining said legs and a U-shaped ear at the junction of each leg and said bridge, said bridge portion and said U-shaped ears extending substantially normal to the planes defined by said legs and said bridge portion being of a length greater than the space between said legs and formed to permit resilient deformation of said retainer by manually grasping said bridge portion and displacing at least one of said legs relative to the plane defined by said other leg to engage or disengage said ears with laterally aligned apertures provided to said spaced brake shoe webs.

4,503,954

DRUM BRAKE WITH CONTROLLED TORQUE AND TORQUE CONTROL VALVE FOR SUCH A BRAKE

Christian Riquart, Paris; Gérard Volan, Velizy, and Pierre Pressaco, La Courneuve, all of France, assignors to Societe Anonyme D.B.A., Paris, France

Filed Dec. 3, 1981, Ser. No. 327,149
Claims priority, application France, Dec. 11, 1980, 80 26283
Int. Cl.³ B60T *11/12, 11/34*
U.S. Cl. 188—331 **34 Claims**



1. A drum brake for a vehicle and of the type comprising two shoes actuated by a hydraulic brake motor and a fluid inlet port for connection to a driving pressure source, said hydraulic brake motor being dimensioned to compensate for a reduction in efficiency of braking to a predetermined lower brake torque limit, the brake comprising a torque control valve defined in a fixed housing which accommodates the hydraulic brake motor and a cut-off valve inserted between said fluid inlet port and said hydraulic brake motor, the torque control valve including a variable volume decompression chamber communicating with said hydraulic brake motor, a movable portion of said decompression chamber maintained in equilibrium between first actuating means operatively connected to one of said shoes and second actuating means responsive to a driving pressure established at said inlet port, said cut-off valve being driven by said movable portion, a hydraulic stop provided in said fixed body by means of a reaction chamber filled with fluid and a main piston defining a movable wall of said reaction chamber on which said one shoe bears, a filling connection being attained between said reaction chamber and inlet port, spring means urging said main piston toward a mechanical stop defining a rest position thereof and the spring means acting counter to the reaction force developed by said one shoe, the mechanical stop comprising a spring coaxial with said main piston and cooperating with said main piston and a fixed support carried by said housing of said torque control valve, to permit limited outward movement of said main piston relative to said housing and thus actuate said one shoe for brake application during reverse movement of the vehicle.

4,503,955

MODULAR CARRYING CASE

John J. Fitzsimmons, Jr., Stop 7, Westmoreland, N.Y. 13490

Filed Mar. 11, 1983, Ser. No. 474,264
Int. Cl.³ A45C *7/00*
U.S. Cl. 190—107 **10 Claims**

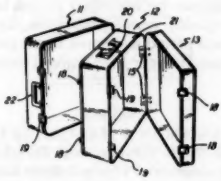
1. A modular all metal carrying case that includes a top cover section, a bottom cover section and at least one center section,

take apart hinges for hingedly connecting each of the sections together whereby the cojoined sections can be closed against each other to form a carrying case,

said at least one center section having a laterally extended web that is formed into an endless, generally rectangular loop, each peripheral edge of the web containing a pair of continuous open channels, one of said channels in each pair lying generally in the plane of the web and opening outwardly and the other of said channels in each pair being perpendicularly disposed in relation to the web and opening inwardly,

said top and bottom cover sections each containing a laterally extended web that is formed into an endless generally rectangular loop that compliments the peripheral contour of the center section, each of said cover sections further including an outer peripheral edge that teminates in an outer channel that is perpendicular to the cover section web and which opens inwardly and an exterior metal cover panel mounted in the outer channel for enclosing the cover section,

one of said cover sections further including an inwardly directed stop face along its inner peripheral edge that closes against a first outwardly opening channel on the center section, and a continuous rib outwardly disposed from the stop face that is receivable in said first outwardly



opening channel when one of the said cover sections is closed against the center section,

the other of said cover sections further including a continuous closure channel positioned along its inner peripheral edge that is positioned generally in the plane of the other of said cover section's web and which opens outwardly, said closure channel being arranged to seat in abutting contact against a second outwardly opening channel on the center section so that the openings of the two abutting channels are in alignment when said other cover section is claosed against the body section, and

an endless grommet means removably secured in one of the two said abutting channels that closes within the other of said abutting channels when the said other cover section is closed against the center section and whereby the grommet means can be removed from the abutting channels in the event the center section is removed from the case thereby allowing the top cover section to close against the bottom cover when the two cover sections are hinged together in assembly.

4,503,956

LOCK-UP CONTROL DEVICE AND METHOD FOR LOCK-UP TYPE AUTOMATIC TRANSMISSION

Tadashi Suzuki; Yoshiro Morimoto; Hideo Hamada, all of Yokosuka; Masaaki Suga, and Takashi Murasugi, both of Yokohama, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Sep. 20, 1982, Ser. No. 419,630
Claims priority, application Japan, Sep. 21, 1981, 56-149261
Int. Cl.³ B60K *41/28*
U.S. Cl. 192—3.31 **9 Claims**

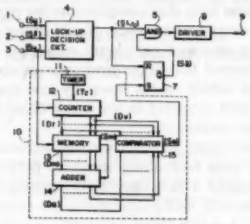
1. A lock-up control device for a lock-up type automatic transmission of a vehicle, the lock-up type automatic transmission including a lock-up clutch which is able to lock up, comprising:

means for generating a pulse train having a period which varies depending upon the vehicle speed;

means for allowing the lock-up clutch to lock up in response to said pulse train;

means for generating a period indicative signal indicative of a current period of said pulse train;

memory means for storing said period indicative signal and for generating a period indicative signal for a previously-stored period indicative signal for a preceding period of the pulse train; and



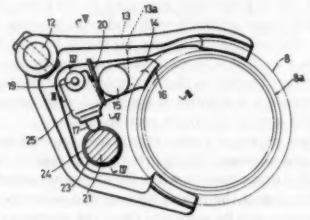
means for preventing the lock-up clutch from locking up when a difference between said period indicative signal generated by said period indicative signal generating means and said period indicative signal generated by said memory means is larger than a preset value.

4,503,957

SHIFT MECHANISM IN A MANUAL TRANSMISSION

Kazuhito Ikemoto; Yukio Terakura, and Takashi Miyake, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Feb. 22, 1983, Ser. No. 468,367
Claims priority, application Japan, Mar. 9, 1982, 57-37842
Int. Cl.³ B60K *41/26*
U.S. Cl. 192—4 C **7 Claims**



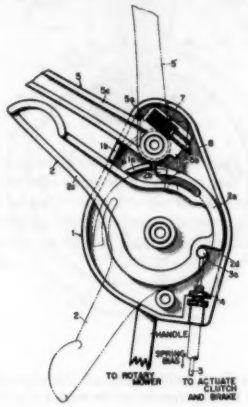
1. In a manual transmission of such a type that when a reverse idler gear mounted on a reverse idler shaft which is fixed on a transmission casing is shifted by a reverse shifting operation, a clutch hub sleeve of a synchromesh unit for a forward speed gear, which unit is mounted on a counter shaft and is adapted to rotate with said counter shaft, said counter shaft being parallel to said reverse idler shaft and rotatably mounted on said transmission casing, is moved in a reverse direction relative to a forward speed geared position through an annular groove formed on said clutch hub sleeve and a shift fork adapted to engage with said annular groove; a shift mechanism comprising an arm rotatably mounted on said shift fork, one end of said arm being formed as a frictional portion adapted to contact with a bottom surface of said annular groove, a cam surface formed on a predetermined element of said transmission and having a projection, and means for applying rotational moment to said arm so as to urge the other end of said arm against said cam surface at all times, said arm being rotated to urge said frictional portion against the bottom surface of said annular groove when the other end of said arm passes over said projection of said cam surface during movement of said clutch hub sleeve in a reverse direction relative to the forward speed geared position.

4,503,958

CONTROL LEVER ASSEMBLY FOR LAWN MOWERS

Tadashi Nishio, Tokyo, Japan, assignor to Starting Industry Company Limited, Tokyo and Nissan Kogyo Co., Ltd., Nagano, both of, Japan

Filed Sep. 27, 1982, Ser. No. 423,717
Claims priority, application Japan, May 25, 1982, 57-88352
Int. Cl.³ B60K *41/24*
U.S. Cl. 192—12 R **3 Claims**



1. A control lever assembly for use on a lawn mower having a handle, a rotary cutter and a brake for the rotary cutter biased into engaged position and releasable by a wire cable extending therefrom when moved to overcome the brake bias, comprising:

a mechanism adapted to be mounted on the handle and having a base member defining a first stop member;

a main lever pivotably mounted on said base and having a displaceable arm engageable with said first stop to prevent pivotable movement of said main lever;

said main lever defining a first detent member engageable with a second stop;

a cable assembly including said wire cable having one end retained in said main lever biased by said brake to urge the main lever in the direction of said first stop and connected to disengage the brake by rotation of said main lever in a direction opposite the bias;

an auxiliary lever pivotably mounted on said base and having a projection engageable upon angular movement with said displaceable arm to displace the latter clear of engagement with said first stop for allowing said main lever to turn in response to means biased;

said auxiliary lever having a second detent member engageable with said first detent member when said main body is pivotably moved beyond said first stop;

and means biasing said auxiliary lever to retract said second detent member out of said recess upon manual release of said auxiliary lever after the brake has been disengaged by rotation of the main lever, whereby said main lever is automatically pivoted to engage the brake when said auxiliary lever is released manually.

4,503,959

CLUTCH LEVER AND ADJUSTMENT METHOD

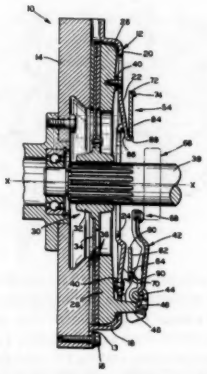
Richard A. Flotow, Ft. Wayne; Jerry L. Rathburn, and DeWayne F. Schlosser, both of Auburn, all of Ind., assignors to Dana Corporation, Toledo, Ohio

Filed Aug. 28, 1981, Ser. No. 297,297
Int. Cl.³ F16D *13/44, 13/75*
U.S. Cl. 192—70.3 **8 Claims**

1. In a friction clutch, including a cover, a plurality of levers

moveable relative to said cover, each of said levers having an inner nose portion engageable with a clutch throw-out bearing, said clutch further including a pressure plate axially adjacent said cover, and pressure means for axially biasing said pressure plate away from said cover; an improvement comprising a method of adjusting said inner nost portions of said levers to a pre-determined common plane during assembly of said clutch, said method comprising the steps of:

a. affixing an axially extending boss to each of said inner nose portions of said plurality of levers,



b. effecting relative axial movement of said pressure plate toward said clutch cover against bias of said pressure means, wherein the axially extending extremity of each of said bosses lies within a pre-determined axial range, and

c. simultaneously grinding by a grinding wheel having an annular concave groove to provide an axially extending contoured extremity on each of said bosses, such that said extremities lie in a pre-determined radially extending common plane within said range.

4,503,960

METHOD AND APPARATUS FOR SENSING A SUPPLY OF SHEETS IN A MAGAZINE

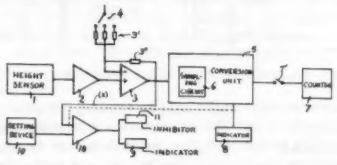
Gerardus A. J. Koeleman, Velden, and Franciscus A. A. E. van de Laarschot, Geldrop, both of Netherlands, assignors to Océ-Nederland B.V., Venlo, Netherlands

Filed Aug. 19, 1982, Ser. No. 409,562

Claims priority, application Netherlands, Aug. 27, 1981, 8103975

Int. Cl.³ B65H 7/02

U.S. Cl. 192—127 **18 Claims**



1. Apparatus for use in a device of the type employing a supply of sheets in a stack and operable in a run requiring a number of said sheets, comprising:

means for sensing the height of said stack to produce a height signal;

calibrating means responsive to said height signal for producing a first signal representing a number of sheets in said stack;

means for producing a second signal representing a number of said sheets required in said run; and

a comparator effective to compare said first and second signals and to produce a third signal representing the comparison.

4,503,961

COIN HANDLING DEVICE

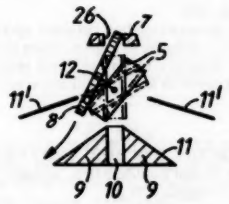
Michael Chittleborough, Berkhamsted, England, assignor to Mars Incorporated, McLean, Va.

Filed Dec. 8, 1982, Ser. No. 448,004

Claims priority, application United Kingdom, Dec. 10, 1981, 8137249

Int. Cl.³ G07F 1/04

U.S. Cl. 194—1 C **14 Claims**



1. A coin handling device comprising a movable element having a through-passage therein through which coins can travel on edge, and actuating means electrically operable to move the element selectively into at least three different working positions relative to coins arriving, in use, at the coin handling device along a delivery path, so that in the first working position the arriving coins travel through the through-passage to be discharged along a second path, and in the second and third positions different external surfaces of the movable element guide the arriving coins along third and fourth paths, respectively.

4,503,962

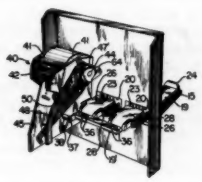
COIN-OPERATED TICKET RELEASE MECHANISM

Joshua Mushell, 1368 Vrain, Denver, Colo. 80204

Filed May 17, 1982, Ser. No. 378,848

Int. Cl.³ G07F 5/04

U.S. Cl. 194—1 G **5 Claims**



1. In a coin-operated ticket dispenser apparatus wherein a plurality of coin-activated slide units are arranged in juxtaposed relation to one another and, upon insertion of a predetermined combination of coins are slidable in unison through a guide slot formed in a housing, each unit having a slide plate reciprocal through said guide slot for extension and retraction between a first inwardly extended position into said housing and a second retracted position away from said housing, and a ticket advance mechanism located within said housing including a rotary drive shaft having one end projecting through a mounting panel with a swingable release arm member positioned on said one end of said shaft to control its rotary movement for advancement of a ticket from said housing, said release arm member disposed in spaced parallel relation between

said mounting panel and said slide units, the combination therewith comprising:

an elongated rigid connecting bar extending across inner ends of said slide plate members in a direction transversely of the slidable movement of said slide plates, said connecting bar traversing the substantial width of said slide plates within said housing, and fastener means rigidly interconnecting said connecting bar to said slide plate members for movement of said slide plate members in unison through said housing;

roller means projecting laterally in offset relation to one end of said connecting bar and beyond one side of said slide plates toward said mounting panel, said roller means movable into engagement with said release arm member in response to sliding movement of said slide plate members in unison to said first inwardly extended position within said housing whereby to impart rotary movement to said shaft over a distance sufficient to advance a ticket from said housing; and

return spring means extending between said connecting bar means and said housing to impart return movement to said slide plate members in unison from said first inwardly extended position to said second retracted position.

4,503,963

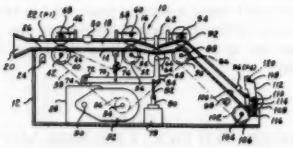
CONTROL CIRCUIT FOR BILL AND COIN CHANGER

Larry E. Steiner, Grand Rapids, Mich., assignor to Rowe International, Inc., Whippany, N.J.

Division of Ser. No. 74,992, Sep. 13, 1979, abandoned. This application May 17, 1982, Ser. No. 379,178

Int. Cl.³ G07F 7/04; B65H 7/00

U.S. Cl. 194—4 C **11 Claims**



1. In a currency dispenser, apparatus including in combination means adapted to be actuated to cause the dispensing of a desired amount of currency, means adapted to be actuated to cause the release of said dispensed currency, and means responsive to the continuous operation of said releasing means for a predetermined period for thereafter inhibiting further actuation of said releasing means.

4,503,964

SAMPLE HANDLING APPARATUS

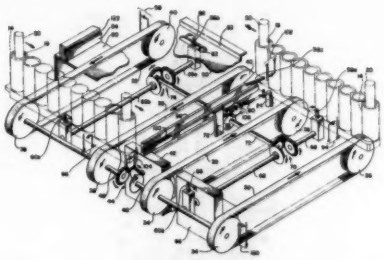
Richard S. Kampf, Costa Mesa, and Richard W. Winn, Orange, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Continuation of Ser. No. 958,075, Nov. 6, 1978, abandoned, which is a continuation of Ser. No. 754,814, Dec. 27, 1976, abandoned. This application Dec. 3, 1979, Ser. No. 99,375

Int. Cl.³ B65G 43/00

U.S. Cl. 198—341 **4 Claims**

4. Apparatus for circulating sample holders along a rectilinear path past an operating station in a sample holder storage compartment, said apparatus of the type including first and second substantially parallel conveyor means on opposite sides of said operating station for engaging and driving sample holders in first and second opposite directions toward and away from said station, first and second means adjacent opposite ends of said first and second conveyor means for halting motion of sample holders in said first and second directions respectively to define first and second longitudinal stop positions for each holder, first and second lateral drive means for engaging each sample holder in said first and second longitudinal stop positions and for laterally moving said holders along respective first and second lateral paths between said first and second conveyor means, said first lateral drive means laterally moving its associated sample holder along said first lateral path into and away from an operative position adjacent said station,



the improvement comprising: switch means in each lateral path responsive to the presence of a sample holder in a respective lateral path; and means responsive to the operation of said switch means indicative of no sample holder in said first lateral path adjacent said operating station for inhibiting operation of said operating station and for conditioning said lateral drive means, if operation of said switch means is indicative of a sample holder in said second lateral path, to move such latter sample holder along said second lateral path, whereby such holder is moved along the second lateral path without the delays associated with operation of the operating station.

4,503,965

APPARATUS FOR HANDLING ROD-LIKE ARTICLES

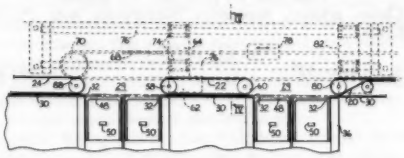
Barry G. Applegate, and Stanley V. Starkey, both of London, England, assignors to Molins Limited, London, England

Division of Ser. No. 195,950, Oct. 10, 1980, Pat. No. 4,423,996. This application Jan. 28, 1983, Ser. No. 462,013

Claims priority, application United Kingdom, Oct. 10, 1979, 7935122

Int. Cl.³ B65G 37/00

U.S. Cl. 198—347 **17 Claims**



1. A conveyor system for rod-like articles, comprising means defining a path for rod-like articles in stack formation, comprising conveying means including an endless band having a conveying surface for moving articles on said path, first drive means for advancing said conveying surface to move articles on said path, and second drive m ans for reciprocating said endless band bodily along said path, said first and second drive means being coupled to said conveying means so that the endless band is driven to maintain said conveyor surface stationary relative to said path during said bodily movement by said second drive means in each direction of said reciprocation along said path when said first drive means is inactive, whereby reciprocation of said endless band may be effected

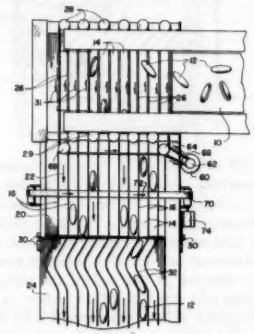
without disturbance to articles in contact with said conveying surface.

4,503,966

HOTDOG ROLL ALIGNER

Gregory C. Papalexis, Cambridge Way, Alpine, N.J. 07620, and Richard I. Elliott, 103 Pennfield Ave., Croton On Hudson, N.J. 10502

Filed Jun. 3, 1983, Ser. No. 500,844
Int. Cl.³ B65G *47/24*
U.S. Cl. 198—382 **9 Claims**



1. An aligning device for flat bottomed rolls, comprising:
means defining a plurality of elongated parallel stalls for receiving flat bottomed rolls, said means extending in a feed direction;
a first conveyor movable over at least a portion of said stalls for distributing rolls into said stalls in a random manner;
a second conveyor movable in a feed direction parallel to said stalls, under said stalls for conveying the rolls along said stalls in the feed direction;
a third conveyor movable at an angle to the feed direction over said second conveyor and under said stalls for flipping rolls in said stalls by frictionally engaging each roll as it passes over said third conveyor to rotate each roll until a bottom of each roll engages said third conveyor, a frictional surface of said third conveyor chosen so that the rolls are not further rotated by movement of said third conveyor under the bottom of each roll; and
drive means connected to said first second and third conveyors for moving said first second and third conveyors.

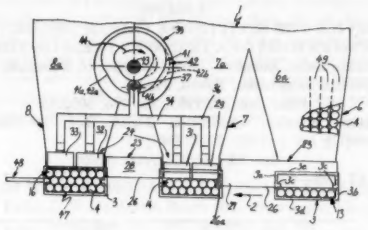
4,503,967

APPARATUS FOR ACCUMULATING ARRAYS OF CIGARETTES OR THE LIKE

Otto Erdmann, Hamburg, and Reinhard Deutsch, Geesthacht, both of Fed. Rep. of Germany, assignors to Hauni-Werke Körber & Co. KG, Hamburg, Fed. Rep. of Germany

Filed Mar. 16, 1983, Ser. No. 475,851
Claims priority, application Fed. Rep. of Germany, Apr. 30, 1982, 3216062
Int. Cl.³ B65G *47/26*
U.S. Cl. 198—419 **20 Claims**

1. Apparatus for accumulating arrays of predetermined numbers of overlapping layers of parallel cigarettes or analogous rod-shaped articles, comprising a magazine arranged to store a supply of rod-shaped articles and including a series of equidistant layer-accumulating sections with outlet openings for layers disposed at different levels; conveyor means having equidistant receptacles each arranged to confine an array, said conveyor means being movable stepwise in a predetermined direction along a path extending past said sections so that successive receptacles register with successive sections during the intervals of dwell of the conveyor means; means for transferring layers from said sections into the registering receptacles during said intervals of dwell; and article retaining means adjacent to said path and including alternating stationary and



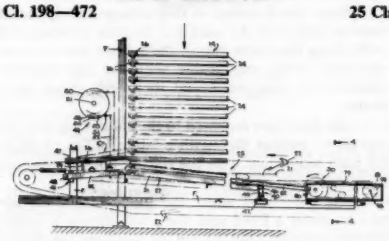
movable portions, as considered in said direction, arranged to engage and hold the articles of the layers in receptacles containing fewer than said predetermined number of layers.

4,503,968

RELATCH ASSEMBLY FOR A CONVEYOR SYSTEM

Rouzas R. Khoylian, Belmont, Mass.; James R. Cowdery, Pelham, N.H., and David B. Park, Wilmington, Mass., assignors to Santrade Ltd., Luzerne, Switzerland

Continuation of Ser. No. 149,448, May 13, 1980, abandoned. This application Jul. 12, 1982, Ser. No. 397,208
Int. Cl.³ B65G *37/00*
U.S. Cl. 198—472 **25 Claims**



1. In combination with a conveyor system having a plurality of carriers, each said carrier having a rod at a forward end thereof and a pair of depending hooks on said rod; a main conveyor for moving a sequential series of said carriers along a horizontal path, said conveyor having a plurality of longitudinally spaced hooks for respectively engaging said rod of each respective carrier and an endless chain for moving said hooks of said conveyor along said path; and an elevator having pairs of opposed tracks disposed in vertically stacked relation for sequentially conveying said carriers in a descending vertical plane; a relatch assembly for sequentially moving each carrier from a respective pair of tracks of said elevator into relatched relation with said main conveyor, said latch assembly comprising
a trackway below said elevator, said trackway having a pair of articulated movably mounted sections;
a carriage movably mounted in said trackway and having a pair of rod means to engage respective depending hooks on said rod of said carrier;
means for reciprocating said carriage on said trackway with said rod means moving into engagement with said depending hooks on a lowermost pair of tracks of said elevator to pull the carrier from said elevator and into said path for subsequent engagement with at least one respective hook of said main conveyor; and
means for moving said trackway sections vertically in synchronism with movement of said carriage along said sec-

tions whereby said sections move vertically upwardly until said carriage engages a respective carrier and then move vertically downwardly.

4,503,969

DEVICE FOR SPLITTING A PAIR OF SEGMENTED TRANSFER BARS OF A TRANSFER PRESS OR THE LIKE

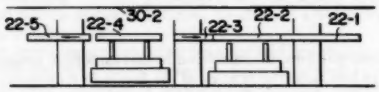
Kiyokazu Baba, Komatsu, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Jun. 28, 1983, Ser. No. 509,015

Claims priority, application Japan, Jul. 2, 1982, 57-099246[U]; Jul. 2, 1982, 57-099249[U]

Int. Cl.³ B65G *25/00, 37/00*

U.S. Cl. 198—621 **7 Claims**



1. In apparatus having a pair of transfer bars extending in parallel spaced relationship to each other for indexing work through one or more processing stations, each transfer bar having a plurality of segments separably joined together, a splitting mechanism for longitudinally separating one transfer bar segment away from another, comprising:

(a) guide means extending longitudinally of one transfer bar;

(b) a carriage disposed under one of the segments of the transfer bar and movable along the guide means;

(c) a splitter pin mounted to the carriage for up and down motion relative to the same and for joint movement therewith along the guide means, the splitter pin when moved upwardly being engageable with the one transfer bar segment for joint movement therewith along the guide means;

(d) at least one slider mounted to the splitter pin for joint up and down motion therewith relative to the carriage and for joint movement with the splitter pin and the carriage along the guide means;

(e) a lever supported under the guide means for pivotal motion about a fixed axis, the lever having a guide slot defined longitudinally therein for receiving the slider so as to allow longitudinal sliding motion thereof;

(f) resilient means acting between the slider and the lever for biasing the slider away from the fixed axis of the lever, whereby the splitter pin is movable up and down relative to the carriage and further movable therewith along the guide means with the pivotal motion of the lever;

(g) a rack and pinion mechanism for causing the pivotal motion of the lever;

(h) a multiple cylinder assemly acting on the rack and pinion mechanism for causing the same to pivot the lever in a controlled manner; and

(i) cam means for holding the splitter pin in engagement with the transfer bar segment during the travel of the splitter pin along the guide means.

4,503,970

ROLLER DEVICE FOR ROLLER CONVEYORS

Kjell Andersson, Löddeköpinge, Sweden, assignor to Alfa-Laval AB, Tumba, Sweden

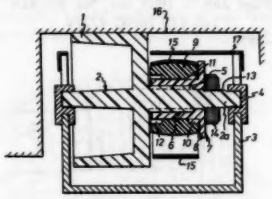
Filed Jan. 24, 1983, Ser. No. 460,575

Claims priority, application Sweden, Feb. 1, 1982, 8200533

Int. Cl.³ B65G *13/06*

U.S. Cl. 198—781 **7 Claims**

1. A roller device for roller trains or roller conveyors, characterized in that it has a unit consisting of one side face of a load-carrying roller (**1**) and a supporting shaft (**2a**, **7**) projecting from said side face and being non-rotatably connected to the load-carrying roller (**1**) and adapted to support a drive pulley (**9**) which is intended to be driven by a belt, chain or the like and can be passed on to the supporting shaft with any one of its ends facing said side face of the roller and which at one of said ends has coupling means (**12**) adapted, when the drive pulley is mounted on the supporting shaft with one end facing said side face of the roller, to engage coupling means (**10**) on the unit so as to provide a non-rotatable engagement between the drive pulley and the load-carrying roller, said drive pulley, at its other end, being so designed (at **11**) that, when the drive pulley is mounted on the supporting shaft with the opposite



end facing said side face of the roller, it comes clear of the coupling means (**10**) of the unit and is rotatable on the supporting shaft, the roller device further having retention means (**8**, **14**) for the drive pulley to retain the drive pulley on said supporting shaft, said means comprising adjustable pressure means (**14**) mounted on said unit for displacement along the supporting shaft and adapted, at the end of the drive pulley which faces away from said side face of the roller, to urge the opposite end of the drive pulley into contact with said side face of the roller.

4,503,971

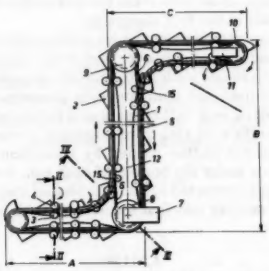
CONVEYING PLANT

Hans-Peter Lachmann, Drosselweg 29, 5000 Köln 60, Fed. Rep. of Germany

Filed Aug. 27, 1982, Ser. No. 412,978

Int. Cl.³ B05G *23/14*

U.S. Cl. 198—833 **10 Claims**



1. A conveying plant comprising:

an endless conveyor belt having a pair of transversely spaced opposite longitudinal edges and spaced apart carriers formed along one surface thereof adapted to receive material to be conveyed by said belt;

respective guide rails formed on said longitudinal edges and comprising pairs of blocks spreadable from one another and fixed in succession along the respective edges and forming guides for said edges along the full lengths thereof;

means including said guides defining at least one relatively steep section ascended by said conveyor belt;

respective endless ropes flanking said conveyor belt and having traction passes receivable between the blocks along each of said edges and clampingly engaged by said blocks for supporting said conveyor belt as said conveyor belt ascends along said section, said ropes passing into and out of said rails at lower and upper regions of said section respectively;

means fixedly positioned along said section engaging said rails for clamping said passes between said blocks; and

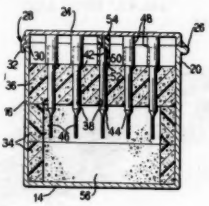
a drive unit for displacing said ropes so that said traction passes transmit tractive force to said belt when said traction passes are clamped between the pairs of blocks forming the rails along the longitudinal edges of said belt.

4,503,972

MICRODRILL PACKAGE

Jerome M. Nelligan, Matteson, and Dale R. Heminover, Chicago, both of Ill., assignors to Federal-Mogul Corporation, Southfield, Mich.

Filed May 23, 1983, Ser. No. 497,068
Int. Cl.³ B65D *85/24, 81/06*
U.S. Cl. 206—379 **22 Claims**



1. A package structure for supporting a protecting a plurality of microdrills each including a shank and a drill body, comprising:

a case including a bottom, a plurality of sidewalls extending from said bottom and forming the periphery of said case, and a cover mounted for opening and closing said case;

cavity means in said case including a shock-absorbing internal wall member extending between said sidewalls spaced from said bottom, said sidewalls and said internal wall member and said bottom forming a cavity, said shock-absorbing internal wall member including hole means defining a plurality of spaced holes therethrough for receiving and embracing the shanks of the microdrills with the drill bodies located and spaced free of contact with said shock-absorbing internal wall member, with one another and with said case within said cavity; and

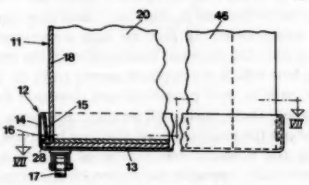
holding means, including said cover, for holding the microdrills in spaced fixed positions when said cover is closed.

4,503,973

TRANSPORT BOX

Hakan Andersson, Kvarnliden 4, Skara, Sweden (532 00)

PCT No. PCT/SE83/00212, § 371 Date Jan. 25, 1984, § 102(e) Date Jan. 25, 1984, PCT Pub. No. WO83/04238, PCT Pub. Date Dec. 8, 1983
PCT Filed May 26, 1982, Ser. No. 577,618
Claims priority, application Sweden, May 26, 1982, 8203258
Int. Cl.³ B65D *19/06, 19/20*
U.S. Cl. 206—386 **9 Claims**



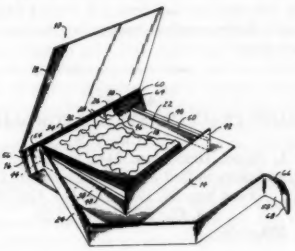
1. A transport box of corrugated cardboard or the like, said box when erected being connectable with a load carrying plane, a pallet, a roller pallet or the like, at which the loading plane (12) is provided with connection means (15) designed to receive locking lugs (26) projectable or foldable from the bottom (21, 22) or lower part of the transport box (11), said locking lugs being arranged to connect the box to the loading plane, characterized in, that the locking lugs (26) comprise U-shaped cuts (25) arranged in connection to a folding line (24) between the side walls (18) and bottom flaps (21) of the transport box, said cuts being arranged to form outside the side walls projecting locking lugs (26) in the plane of the flaps (21) when these are folded to bear against the loading plane, and said locking lugs (26) being insertable under blocking surfaces (16) arranged at the connection means (15).

4,503,974

ALBUM WITH REMOVABLE PAGES AND ENCLOSURE

Barry Lane, 2225 McMullen Booth Rd., Clearwater, Fla. 33519

Filed Sep. 26, 1983, Ser. No. 535,764
Int. Cl.³ B65D *85/00*
U.S. Cl. 206—457 **8 Claims**



1. An album, comprising in combination:

a front cover;

a back cover;

a binder member interconnecting said front cover and said back cover to permit said album to open and close to and from an opened position and a closed position;

a plurality of pages;

an enclosure connected to one of said front cover and said back cover, said enclosure comprising an interconnected lower wall, upper wall, and front wall forming a tray, the rearward ends of said lower wall and said upper wall being positioned substantially adjacent to said binder whereby said binder defines a rearward wall of said enclosure to further form said tray;

means for retaining said pages away from the interior area of the tray of said enclosure when said album is in said closed position; and

a strap connected to said binder for positioning about said enclosure when said album is in said closed position.

4,503,975

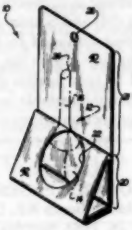
NAILPOLISH PACKAGE

George Meyers, and David C. Mueller, both of Ashland, Ohio, assignors to The Garber Company, Ashland, Ohio

Filed Apr. 25, 1983, Ser. No. 488,431
Int. Cl.³ B65D *73/00, 75/02, 652/16*
U.S. Cl. 206—486 **7 Claims**

1. A package for retaining and displaying an article comprising an article retaining portion and a display portion for containing display material, said package including a single layer back panel having first and second sections, said article retaining portion comprising a bottom portion, an angle panel joined to one end of said bottom portion and extending at an acute angle therefrom and having an opening therethrough adapted to receive the article therethrough, said opening being dimensioned so as to prevent the article from being displaced through the opening, and a two layer back portion comprising

said first section of said back panel and an upright panel joined to said bottom portion and having an upper end at which said angle panel is foldably connected to said upright panel, said



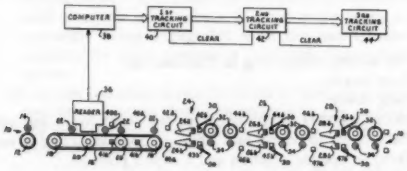
upper end of said upright panel being disposed adjacent a location intermediate said first and second ends of said back panel, said display portion comprising said second section of said back panel.

4,503,976

ENVELOPE TRACKING SYSTEM FOR MAIL SORTING MACHINES

Wilbert L. Cloud, Grandview, Mo., and Steve Shaw, Lenexa, Kans., assignors to Bell & Howell Company, Chicago, Ill.

Filed Sep. 30, 1982, Ser. No. 428,714
Int. Cl.[3] B07C *3/06, 5/36*
U.S. Cl. 209—546 **10 Claims**



1. In a mail sorting machine having a conveyor for transporting envelopes along an envelope path, a plurality of gates for diverting the envelopes off of said path control circuitry for comparing data indicative of each envelope with preassigned data corresponding to each gate approached by the envelope, means for controlling each gate in a manner to divert an envelope off of said path in the event of coincidence between the data indicative of the envelope and data corresponding to the gate, a clock controlled circuit included in said control circuitry for initiating same, and sensing means for normally applying a clock pulse to said clock controlled circuit upon approach of an envelope toward a gate, the improvement comprising:

first switch means for disabling said sensing means in a test position, said first switch means having a normal position wherein the sensing means is enabled;

an astable oscillator for applying test clock pulses to said clock controlled circuit in a test mode of operation to simulate envelopes successively approaching the gates; and

second switch means having a normal position disconnecting said oscillator from the clock controlled circuit and a test position connecting said oscillator with the clock controlled circuit to apply test clock pulses thereto in the test mode,

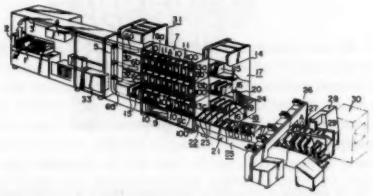
whereby in the normal position of said first and second switch means said clock controlled circuit is clocked by envelopes successively approaching the gates and in the test position of said first and second switch means said oscillator applies to the clock controlled circuit test clock pulses simulating envelopes successively approaching the gates.

4,503,977

POSTAL MATTER SORTING APPARATUS

Takeshi Kohno, Yokohama; Kazuhito Haruki, Kawasaki, and Yasuo Nagase, Tokyo, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Japan

Filed May 5, 1982, Ser. No. 375,012
Claims priority, application Japan, May 19, 1981, 56-75160
Int. Cl.[3] B07C *3/06*
U.S. Cl. 209—564 **12 Claims**



1. A mail sorting apparatus for sorting mail in accordance with codes on said mail detected by optically scanning said codes, comprising:

a plurlaity of stacking bins for receiving and storing said mail arranged in at least one row;

means for reading out the codes provided on the mail and distributing the mail to said stacking bins in accordance with said codes;

a push-out mechanism, provided on each of said stacking bins, for selectively pushing out mail for said stacking bins;

a conveyance section having a plurality of trays, forming a conveyance path along the row of said stacking bins, for receiving and conveying in a predetermined direction the mail taken out from said stacking bins;

means for detecting when a predetermined amount of the mail has been stacked in each of said respective stacking bins and producing a detection signal;

means for producing a stop signal when the mail sorting operation is stopped;

means for controlling the push-out operation of the mail from each of said bins to a respective tray, said control means including first means responsive to said detection signal for causing said push-out mechanisms to operate so as to take out the mail from said respective stacking bins to said trays when said predetermined amount of mail has been stacked in the bins, and second means for controlling the take-out of the mail in response to said stop signal, said second means detecting mail on said conveyance path, operating only the push-out mechanisms of the respective stacking bins which are opposite empty trays on the conveyance path in said predetermined direction from the region where there exists mail on the conveyance path so as to take out the mail from said stacking bins, and further operating the push-out mechanism of the stacking bin which is initially opposite the region on the conveyance path where there exists mail to take out mail from said stacking bin when the conveyance path subsequently has an empty region opposite said stacking bin due to movement in said predetermined direction; and

means for receiving mail from each of said trays and binding said respective mail.

4,503,978

SUPPORT FOR CYLINDRICAL OBJECTS SUCH AS ROLLED COILS

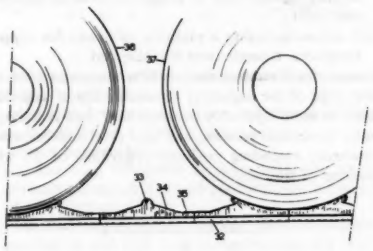
Arie Smit, Schoorl, and Johannes W. Marcus, Beverwijk, both of Netherlands, assignors to Estel Hoogovens B.V., Ijmuiden, Netherlands

Filed Sep. 8, 1982, Ser. No. 415,940

Claims priority, application Netherlands, Sep. 24, 1981, 8104390

Int. Cl.[3] A47F 7/00

U.S. Cl. 211—13 5 Claims



1. Support for supporting cylindrical objects from rolling, having at least two parallel rows of supporting members and means to maintain said supporting members in a row, each row having a plurality of unitary supporting members lying end to end in contact with each other, each said supporting member consisting of resiliently deformable material and being so shaped that when no load is applied to the row the upper surface of each row has along its length a regularly repeating profile comprising a series of upwardly projecting ridges and, between each adjacent pair of said ridges, two sloping regions extending downwardly and towards each other from the respective ridges and a substantially horizontal region lying between the said sloping regions.

4,503,979

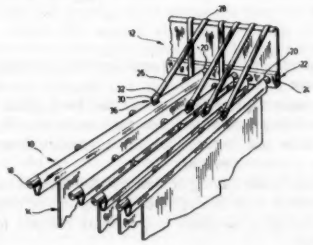
TWO PIECE CLAMP BINDER

Joseph E. D. M. Morand, Montreal, Canada, assignor to Norman Wade Company Limited, Scarborough, Canada

Filed Sep. 28, 1982, Ser. No. 425,958

Int. Cl.[3] A47F 7/00

U.S. Cl. 211—45 5 Claims



1. A clamping device to grasp sheet material along an edge thereof in combination with a support structure for suspending the device in a substantially horizontal position with sheet material grasped in the device to hang vertically downward therefrom,

the clamping device comprising:

first and second continuous, elongate jaw-like clamping members of angle section between first and second longitudinal edges thereof,

said clamping members hinged together along their first edges to pivot relative to one another about an axis for movement from an open position in which their second edges are sufficiently spaced to permit placement of said sheet material therein to a closed position in which their second edges are brought sufficiently close together to grasp said sheet material therebetween,

said clamping members being hinged together with their angle sections opening towards each other to define an interior space bordered by interior surfaces of said first and second clamping members,

tensioning means extending through said interior space coupling said first clamping member to said second clamping member for activation to regulate the distance therebetween for relative pivoting of said first and second clamping members between said open and closed positions,

tension activating means located on an exterior surface of one of said first and second clamping members and coupled to the tensioning means for activating the tensioning means,

said first and second clamping members being hinged together by:

a first substantially C-shaped section member provided on the first edge of said first clamping member defining therein a longitudinally extending groove of part-circle section of a first diameter, and a second part-cylinder member on the first edge of said second clamping member having a part-cylindrical exterior surface of a second diameter marginally smaller than the first diameter, said second part-cylinder member defining an aperture of substantially circular section therein coaxial with said axis; said second part-cylinder member longitudinally slidably receivable in said groove of the first C-shaped section member to be pivotable therein about said axis between said open and closed positions;

a first opening provided radially through the first C-shaped section member; a second opening provided radially through the second part-cylinder member;

whereby with the first and second clamping members in longitudinal alignment, the first and second openings align and provide for access from a top of an assembled device into the aperture of circular section throughout all open and closed positions;

said clamping device being detachably supported from the support structure with the clamping device substantially free to pivot as a unitary body about said axis through which the first and second clamping members are hinged for pivoting with respect to one another;

pivoting permitting means coupling the support structure to the device and permitting pivoting of the device as a unitary body about said axis, said pivoting permitting means passing through said first and second openings and contacting interior surfaces of said aperture proximate said first and second openings.

4,503,980

DEVICE FOR STACKING OF ARTICLES OF WHICH THE UPPER MOST ARTICLE OF THE STACK IS MAINTAINED AUTOMATICALLY AT A CERTAIN LEVEL

Pieter L. Kooiman, 17 Achterambachtweweg, Hendrik Ido Ambacht, Netherlands

Filed Oct. 12, 1982, Ser. No. 433,717

Claims priority, application Fed. Rep. of Germany, Jun. 15, 1982, 8217130[U]; European Pat. Off., Jun. 18, 1982, 82200768.8

Int. Cl.[3] A47F 1/06

U.S. Cl. 211—41 2 Claims

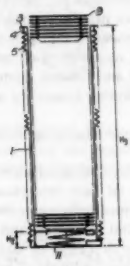
1. A device for stacking articles in which the uppermost article is always kept at a certain height, comprising;

a vertical container for receiving a stack or articles having an open upper end and an outwardly extending edge flange around said open upper end;

a carrier for supporting a stack of articles within said con-

tainer and mounted for vertical movement relative to said container, said carrier including an upper support member on which the lowermost article of the stack of articles is supported, a lower bearing member spaced from said support member having an outer edge projecting outwardly beyond said container, a helical compression spring positioned between said support and bearing members for supporting said support member for vertical movement relative to both said bearing member and said container;

a plurality of main tension springs each having first and



second opposite ends, said first ends connected to said edge flange and said second ends connected to the outer edge of said bearing member for suspending said carrier from said container;

means on said support member and said bearing member for containing opposite ends of said helical compression spring; and

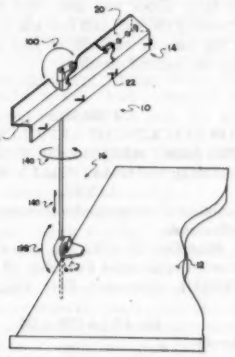
said compression helical spring having a constant of elasticity less than that of the main tension springs and a diameter of substantially the same dimension as said container to provide stable horizontal support to a stack of articles at all times.

4,503,981

DRAFTING TOOL SUPPORT APPARATUS

Rodolfo A. Coronado, 35012 Hollyhock St., Union City, Calif. 94587

Filed Sep. 29, 1982, Ser. No. 426,945
Int. Cl.³ A47F 7/00
U.S. Cl. 211—69.5 **16 Claims**



1. A drafting tool support apparatus especially suitable for mounting to an angularly adjustable table top of a drafting table, said apparatus comprising:

(a) a shelf arrangement including

(i) means defining a longitudinally extending flat shelf for supporting rulers, erasers and the like,

(ii) means fixedly located above a longitudinal section of said shelf for supporting a plurality of upwardly extending pens and/or pencils in spaced-apart relationship to one another, and said pen and/or pencil supporting means including a longitudinal plate member fixedly connected above a longitudinal section of said shelf and transversely inclined at an acute angle with the latter in longitudinally parallel relationship therewith, said plate member including a front face, a back face and a plurality of holes therethrough for respectively receiving and containing said pens or pencils at an acute incline with said shelf

(iii) means including a plurality of hooks for supporting templates, triangles and the like; and

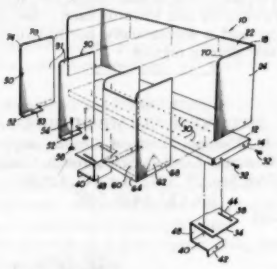
(b) means for mounting said shelf arrangement over and to one edge of the angularly adjustable top of said drafting table so as to adjustably maintain said shelf in a longitudinally horizontal position and said pens and/or pencils in upwardly extending positions regardless of the angular position of the table top.

4,503,982

DISPENSER FOR CUP LIDS AND STRAWS

Lloyd J. Lewis, Stone Mountain, Ga., assignor to Modular Engineering Corporation, Atlanta, Ga.

Filed May 18, 1983, Ser. No. 495,762
Int. Cl.³ A47F 5/00
U.S. Cl. 211—184 **8 Claims**



1. A dispenser for cup lids and straws comprising:

(a) a base plate;

(b) a cabinet plate fastened to the base plate, forming a restraining surface and side surfaces of the dispenser;

(c) at least one support bracket adjustably fastened to the base plate, comprising:

(i) a slot plate having at least one slot formed to cooperate with at least one spaced opening in the base plate for adjustably fastening the support bracket to the base plate;

(ii) a foot plate for fastening the support bracket to a mounting surface; and

(iii) an angle plate connecting the slot plate and foot plate, the angle plate configured to dispose the slot plate and the foot plate at an angle of inclination relative to each other of between zero and forty-five degrees, inclusive; and

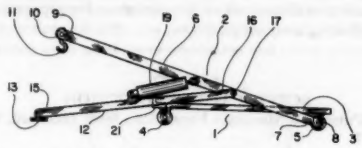
(d) at least one divider section adjustably fastened to the base plate to divide the dispenser into at least two lid compartments, and to allow the dispenser to accommodate numerous sizes of lids.

4,503,983

DOLLY EQUIPPED WITH LOADING-UNLOADING SCISSOR HOIST

Hyok S. Lew, 7890 Oak St., Arvada, Colo. 80005

Filed Aug. 2, 1982, Ser. No. 404,322
Int. Cl.³ B66C *23/06*
U.S. Cl. 212—187 **2 Claims**



1. A dolly equipped with a loading-unloading scissor hoist comprising in combination:

(a) a platform of rectangular shape including a plurality of wheels rollable on a floor or the ground;

(b) a scissor hoist including;

(1) a first long elongated member with one extremity pivotably connected to said platform near a first corner of said platform;

(2) a second long elongated member disposed substantially parallel to said first long elongated member with one extremity pivotably connected to said platform near a second corner of said platform wherein said first and second long elongated members are pivotably about a first common pivoting axis;

(3) a cross member rigidly connected to the other extremity of said first long elongated member opposite to said one extremity and connected to the other extremity of said second long elongated member opposite to said one extremity, said cross member including means for securing an object to be hoisted by said scissor hoist;

(4) a first short elongated member with one extremity pivotably connected to said first long elongated member intermediate said one and the other extremity of said first long elongated member wherein said first short elongated member is pivotable about second common pivoting axis, said first short elongated member including a foot plate connected to the other extremity of said first short elongated member in a hinged relationship;

(5) a second short elongated member disposed substantially parallel to said first short elongated member with one extremity pivotably connected to said second long elongated member intermediate said one and the other extremity of said second long elongated member wherein said second short elongated member is pivotable about said second common pivoting axis, said second short elongated member including a foot plate connected to the other extremity of said second short elongated member in a hinged relationship;

(6) a first linear actuator providing a scissor movement of said first long elongated member and said first short elongated member substantially straddling said platform about said second common pivoting axis;

(7) a second linear actuator providing a scissor movement of said second long elongated member and said second short elongated member substantially straddling said platform about said second common pivoting axis; and

(8) a first means disposed near a third corner of said platform diagonally opposite to said second corner for removably anchoring said the other extremity of said first short elongated member, and a second means disposed near a fourth corner of said platform diagonally opposite to said first corner for removably anchoring said the other extremity of said second short elongated member;

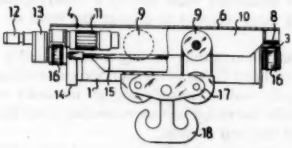
whereby, when said foot plates respectively connected to said the other extremities of said first and second short elongated members are placed on a floor or the ground, said scissor hoist is usable for hoisting an object from the floor or the ground in loading and for hoisting an object from said platform in unloading, and when said the other extremities of said first and second short elongated members are respectively anchored to said first and second means for removably anchoring, said cross member affixed to said first and second long elongated members is usable as a handle of said dolly.

4,503,984

TELFER CARRIAGE

Olavi Jussila, Hyvinkää, Finland, assignor to Kone Oy, Helsinki, Finland

Filed Nov. 10, 1982, Ser. No. 440,725
Int. Cl.³ B66C *17/00*
U.S. Cl. 212—205 **6 Claims**



1. A telfer carriage having light weight and low structural height, comprising:

dual end supports for the carriage, said end supports being mutually rigidly joined together by a non-rotating axle; a carrying wheel pair located within said end supports and rotatably mounted on opposite ends of said axle;

a supporting beam having said dual end supports pivotally affixed to the supporting beam by dual pivots, said supporting beam including a web plate and having a set of rope sheaves rotatably carried therein; and

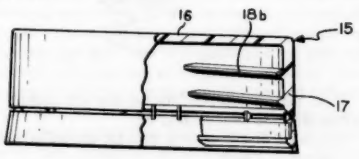
hoisting and carriage displacing mechanisms and a rope drum which is rotatably carried on said axle, whereby the dual pivots provided between the dual end supports and the supporting beam prevent bending loads imposed on the supporting beam from being transmitted to the end supports and thereby provides light weight and low structural weight for the carriage.

4,503,985

TAMPER INDICATING PACKAGE WITH LARGE DIAMETER OPENING

Peter T. Swartzbaugh, Toledo, and Edward M. Hehl, Perrysburg, both of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Oct. 20, 1983, Ser. No. 543,700
Int. Cl.³ B65D *41/34*
U.S. Cl. 215—252 **10 Claims**



1. A tamper indicating package comprising

a container having a neck finish with a large opening,

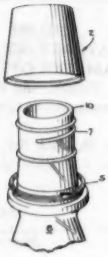
said neck finish having threads on the exterior thereof,
said neck finish including an annular bead spaced axially from the threads and away from the opened end of the container,
a plastic closure having a top wall and a peripheral skirt,
said skirt being formed with threads adapted to engage the threads on the container,
said threads on the closure being interrupted and extending in portions of less than 180° with respect to an axial plane through the closure such that diametrically opposed portions of the skirt are without threads,
an integral tamper indicating band extending axially from the periphery of the skirt and being connected thereto by an internal groove which defines a weakened line,
a plurality of circumferentially spaced integral bridges spanning portions of the internal groove,
said tamper indicating band having an outer peripheral surface that is inclined downwardly and outwardly from the skirt,
said tamper indicating band having an interrupted radially extending bead adapted to engage the bead on the container,
said bead on the container having a downwardly and outwardly inclined peripheral surface extending axially downwardly and outwardly and an inwardly extending substantially flat radial surface extending from the extremity of said inclined surface,
said bead on the tamper indicating band being interrupted along the same axial plane as said threads on the skirt so that the tamper indicating band is without a bead in substantially the same areas as the portions of the skirt are without threads such that when the closure is threaded on a container, the bead on the tamper indicating band will move downwardly on the inclined surface of the annular bead on the container and flex and snap over the bead on the container into engagement with the radial surface of the annular bead on the container and when the closure is unthreaded from the container,
the tamper indicating band will be broken along the weak line.

4,503,986

TAMPER-EVIDENT CLOSURE CAP

Frank S. Nixdorff, Baltimore, Md., and Arthur H. Dornbusch, Cincinnati, Ohio, assignors to Anchor Hocking Corporation, Lancaster, Ohio

Filed Mar. 30, 1984, Ser. No. 595,534
Int. Cl.³ B65D *41/34*
U.S. Cl. 215—252 **10 Claims**



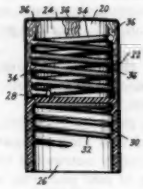
1. A tamper-evident closure cap for sealing a container comprising the combination of:
a molded plastic sealing portion including a cover and a depending skirt;
thread means on said skirt for engaging cooperating thread means on the container;
a molded plastic tamper indicating member for encircling the container mouth below the closure cap;
means for preventing the indicating member from moving on the container;
said indicating member comprising spaced portions detachably connected by frangible members;
ratchet means operatively coupling said sealing portion to one of said indicating member portions causing said one portion to turn with the sealing portion when the sealing portion is turned off of the container for separating the indicating member portions.

4,503,987

SCREW CAP CONSTRUCTION

Rubin Potoff, 46 Mountain Farms Rd., West Hartford, Conn. 06117

Filed May 29, 1984, Ser. No. 614,520
Int. Cl.³ B65D *41/04*
U.S. Cl. 215—329 **26 Claims**



1. A multi-part screw cap for a container, comprising in combination:
(a) a thin-walled cup-like shell closed at one end, said shell presenting the exterior surface of the cap and having an annular side wall,
(b) an insert member having an annular side wall adapted to engage and fit generally within the inner surface of the annular wall of the shell, said insert member having internal threads adapted to mate with the external threads on the neck of a container,
(c) means fixedly securing the insert member within the annular wall of the shell,
(d) a one-piece weight member constituted as a single wire coil disposed completely within the shell at a location between the closed end thereof and the insert member so as to provide a weighted feel to the screw cap, and
(e) means for securing said weight member to said shell against inadvertent loosening during subsequent use of the cap.

4,503,988

GAS COLLECTING TENSIONED RESERVOIR COVER

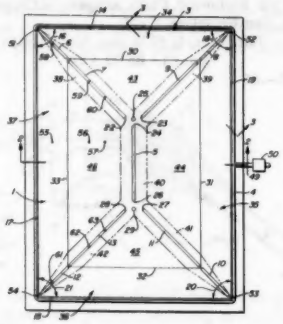
Dennis H. Gerber, Los Gatos, Calif., assignor to Burke Industries, Inc., San Jose, Calif.

Filed Sep. 17, 1984, Ser. No. 651,665
Int. Cl.³ B65D *88/38*
U.S. Cl. 220—219 **19 Claims**

1. A tensioned reservoir cover for placement upon the fluid surface of an open reservoir comprising:
a. a flexible cover member of substantially fluid impervious material of sufficient area to cover the surface of said reservoir;
b. means connecting the perimeter of said cover member to the perimeter of said reservoir;
c. gas collecting means located at the periphery of said reservoir;
d. sump weighting means positioned with respect to said cover member at pre-selected positions;
e. a plurality of cover sump portions formed in said cover by said weighting means, each of said sump portions being defined, narrow, elongated and interconnected and having generally vertical sidewalls in tension and having a

selected location for all working fill levels of said reservoir;

f. a plurality of generally horizontal cover portions formed in said cover by said weighting means, each of said horizontal cover portions having a selected geometric shape and positioned at a selected location for all working fill levels of said reservoir and all of said horizontal cover portions are in tension in at least two different horizontal directions of sufficient magnitude to permit workmen to traverse all portions of said horizontal cover portions for



all working fill levels with said horizontal cover remaining substantially planar in sustaining the weight of the workmen;

g. said horizontal cover portions are bordered by said reservoir perimeter and said sump portions and cover substantially all of the surface of said reservoir for all working fluid level conditions; and

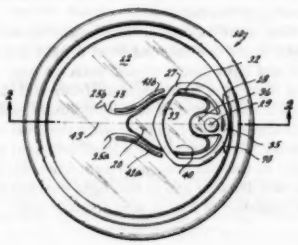
h. said horizontal cover portions bordering said reservoir perimeter are in gaseous communication with said gas collection means.

4,503,989

CAN END WITH RETAINED TEAR STRIP

Omar L. Brown, Kettering; Don B. Peters, and James R. Schubert, both of Dayton, all of Ohio, assignors to Ermal C. Fraze, Dayton, Ohio

Filed Feb. 1, 1984, Ser. No. 575,904
Int. Cl.³ B65D *17/34*
U.S. Cl. 220—269 **19 Claims**



1. An end structure for an easy-opening container comprising:

a center panel having a panel radius extending 360° around the periphery thereof;

a scoreline in said center panel defining a pour panel such that when said scoreline is ruptured a pour opening is formed;

tab means attached to said center panel and including a lifting end and an opening end and operative in response to lifting of said lifting end to initiate and to continue rupture of said scoreline;

said panel radius being coined in a region less than 360° of the periphery thereof; and

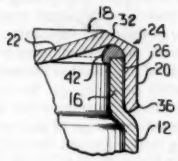
said region being operative to direct buckling, if it occurs, to a portion of the end structure other than in the region of said coined panel radius.

4,503,990

DRAWN CAN FOR FOOD AND THE LIKE

Donals J. Roth, Westport; Charles S. Kubis, Weston, both of Conn., and John Walter, Evergreen Park, Ill., assignors to Continental Packaging Company, Inc., Stamford, Conn.

Filed Mar. 7, 1984, Ser. No. 587,099
Int. Cl.³ B65D *17/40*
U.S. Cl. 220—276 **19 Claims**



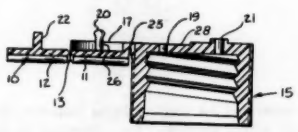
1. An end unit for a container subject to retorting and like different heat conditions, said end unit comprising a tubular securing flange, an end panel, and a connecting corner, said connecting corner defining a weakening line for facilitating the removal of said tubular securing flange from said end panel at said connecting corner.

4,503,991

TWO PART SNAP HINGE

Michael Joyce, 287 Smoke Rise Rd., Kinnelon, N.J. 07405

Filed Jan. 6, 1984, Ser. No. 568,623
Int. Cl.³ B65D *43/14, 51/04*
U.S. Cl. 220—339 **19 Claims**

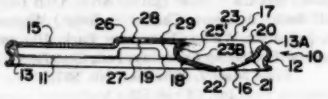


1. A hinge including a swingable portion, a reference portion, and a reduced connecting portion between said swingable portion and said reference portion, said reduced connecting portion being integral with said swingable portion and said reference portion and extending continuously between a first point and a second point in a manner such that said reduced connecting portion follows a path which is displaced from a straight line connecting said first and second points whereby upon swinging said swingable portion about said reduced connecting portion said swingable portion swings through an intermediate position such that on either side of said intermediate position said swingable portion is urged away from said intermediate position.

4,503,992
DETACHABLE COVER FOR DISPOSABLE DRINKING CUPS, CONTAINER AND THE LIKE

Jerry A. Sitko, 412-5 Confederation Bay, Brandon, Manitoba, Canada (R7B 2P7); John Hrynkiw, 635 B St., Brandon, Manitoba, Canada, and Marilyn I. Brazeau, P.O. Box 158, Erickson, Manitoba, Canada (R0J 0P0)

Filed Sep. 26, 1983, Ser. No. 535,777
Claims priority, application Canada, Apr. 27, 1982, 426795
Int. Cl.³ A47G 19/22
U.S. Cl. 220—90.4 20 Claims

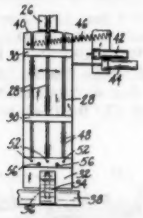


1. A detachable cover for the upper open end of containers for hot or cold liquid beverages; comprising in combination a substantially circular panel, a peripheral attaching flange depending from the edge of the panel substantially perpendicular to the plane of the panel and including upper end engaging means around the inside of the junction between said panel and said flange to detachably snap engage the cover around the upper side of the associated container when installed thereon and a flanged area adjacent one edge of said panel surrounding and defining a drinking orifice formed through said panel, said flanged area including a flange portion on the underside of said panel extending downwardly and outwardly from the underside of the panel and defining a portion of said drinking orifice.

4,503,993
APPARATUS FOR FEEDING LOOSE FASTENERS TO A PLURALITY OF FASTENING MACHINES

Oscar H. Ginnow, and Roger H. Ginnow, both of Hopbrook Rd., Bethany, Conn. 06525

Filed Feb. 2, 1983, Ser. No. 463,231
Int. Cl.³ B65G 57/16
U.S. Cl. 221—10 18 Claims



1. An apparatus for feeding loose fasteners from a sorter having one output guideway to a plurality of fastening machines comprising:

a plurality of holding guideways having an input end and an output end for holding a quantity of fasteners to be sequentially fed to each fastening machine, the input end of the holding guideways being moveable with respect to the output guideway of the sorter;

guideway positioning means for positioning the input end of each holding guideway in communication with the output guideway of the sorter to enable fasteners to be fed into each holding guideway;

control means for controlling the guideway positioning means;

means for sensing the presence or absence of fasteners on each holding guideway connected to the control means, the control means responding to the sensed absence of fasteners on one of the holding guideways by positioning the input end of said one of the holding guideways in communication with the output guideway of the sorter;

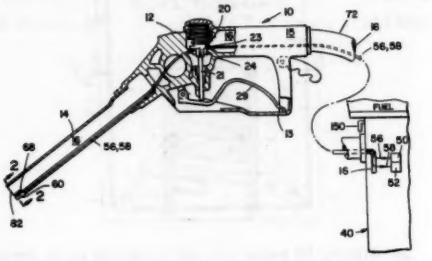
a first retaining means for temporarily holding each fastener as it arrives at the output end of each holding guideway; and

means for transferring each fastener from the first retaining means to its respective fastening machine.

4,503,994
FIBER OPTIC FUEL SHUTOFF SYSTEM

Walter R. Pyle, Richmond, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Oct. 1, 1979, Ser. No. 80,591
Int. Cl.³ B67D 5/08
U.S. Cl. 222—64 2 Claims



1. A method for use with a fuel-dispensing system to automatically stop fuel flow into a fuel tank being filled when the level of fuel in the tank reaches a predetermined level, said fuel dispensing system including a fuel dispensing nozzle having a main body portion, a discharge spout projecting from the main body portion, said discharge spout having an outlet end proportioned for each of insertion into a fill pipe of the fuel tank, a fuel dispenser, a fuel hose connected between the nozzle main body portion and said dispenser, and a flow passage extending through said discharge spout, the nozzle main body portion, said fuel hose, and said dispenser for the flow of fuel therethrough, comprising:

forming a housing in said flow passage near the outlet end of said discharge spout to define a chamber wherein fuel may only enter said chamber through an opening in the lower surface of said discharge spout;

extending two light guides from the fuel dispenser and through the flow passage into said chamber to define a detector gap therein;

transmitting light having a wavelength between approximately 3.2 and 3.6 microns from a light source through one of said light guides to said detector gap;

receiving light at a light receiver from said detector gap through a second one of said light guides; and

automatically stopping fuel flow when the level of fuel in the tank being filled rises above a level sufficient to enter said chamber so that the passage of light from said light source across said detector gap to said light receiver is prevented by the presence of fuel in said detector gap.

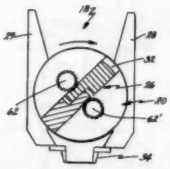
4,503,995
QUANTITY-METERING DEPOSITOR FOR FLOWABLE FOOD PRODUCTS

Joseph R. Anderson, Ada, Mich., assignor to Werner Lehara, Inc., Grand Rapids, Mich.

Filed Mar. 29, 1982, Ser. No. 362,906
Int. Cl.³ G01F 11/02; A21C 5/04
U.S. Cl. 222—219 9 Claims

1. For use in a repetitive, cycling, depositor apparatus of the type having at least one piston mounted for reciprocal movement within a piston passage and defining therewith a chamber

whose volume determines and meters a discrete quantity of flowable material, a piston and cylinder assembly comprising: a rotatable member and means mounting such member for rotation about an axis, said member generating a cylinder of revolution when rotated about said axis; said rotatable member having at least one piston passage extending transversely of said member and opening out of different side portions thereof, said piston passage being positioned generally diametrically of said cylinder of revolution and orthogonal of its said axis of rotation; a shuttle-like slide piston disposed for alternating back-and-forth movements within each of said piston passages; said shuttle-like pistons and transverse passages defining a metering chamber at the end of each piston, such chamber being located to receive a charge of flowable material at one extremity of piston movement and to eject such charge of



material at the other extremity of shuttle-like piston movement, said shuttle-like piston comprising at least two separate but mutually coupled piston components, and including means for rigidly linking said piston components together for unitary movement during their alternating back-and-forth shuttle-like piston movements; and means for adjusting the effective stroke length of at least certain of said two-component pistons by adjustably changing the relative position of one such piston component with respect to the other while within their respective piston passages and while rigidly coupled together to thereby change the volume of the metering chamber defined by such pistons and passages, said means including gear teeth on each of said piston components in the form of a rack and gear means engaging said rack teeth to move the associated piston component relative to the other piston component by geared movement of its rack teeth.

4,503,996

LIQUID ATOMIZER HAVING A DOUBLE-ACTING PUMP

Miloslav Sorm, Prague; Josef Langpaul, Otrokovice; Karel Ulbert, Prague; Karel Kadlec, Uhersk Brod; Stanislav Skalick , Prague; Miroslav Brázdil, Bilovice; Stanislav Nespurek, Prague; Jaromír Kensa, Gottwaldov; Miroslav Zvonícek, Prague, and Zdenek Hrdina, Hluk, all of Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

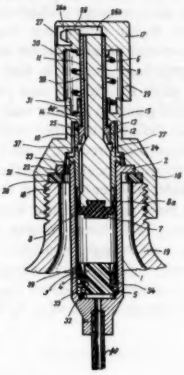
Filed Dec. 16, 1982, Ser. No. 450,213

Claims priority, application Czechoslovakia, Dec. 16, 1981, 9373-81

Int. Cl.³ B05B *11/02*

U.S. Cl. 222—321 **10 Claims**

1. A liquid atomizer adapted to be mounted upon the neck of a bottle, said atomizer having a reciprocating pump for spraying liquid fed from the bottle through a nozzle on the atomizer, said pump having a cylinder, a piston reciprocable therein, housing means to attach the pump to a bottle neck, means including a piston rod reciprocable through sleeve means at the top of the cylinder to drive the piston, liquid conducting means to convey a quantity of liquid from the bottle into and to retain it in the cylinder in a space therein above the piston in each cycle of operation of the pump, and means to conduct liquid from the space in the pump above the piston to the nozzle at each upward stroke of the piston, the means to transfer liquid from the pump to the nozzle comprising a longitudinal channel on the piston rod, the sleeve means having two sets of axially spaced ports therein and functioning as the fixed body of a reciprocable valve, a part secured to the piston rod functioning as the movable valve element of said reciprocable valve, the upper set of ports having radially outer ends adapted to communicate with the interior of the bottle, the lower set of ports having radially inner ends communicating with a lower part of the channel which conducts liquid to the nozzle, and comprising annular obturator means on said part functioning as



a movable valve element to close the inner ends of the upper sets of ports and to open the lower set of ports when the piston is in its upper terminal position, to open both sets of ports when it is disposed in an intermediate position between the two sets of ports, and to cut off both sets of ports from communication with the channel supplying liquid to the nozzle when it lies beneath the lower set of ports.

4,503,997

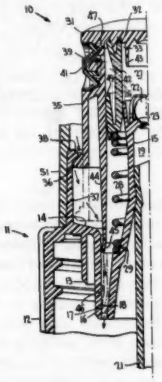
DISPENSING PUMP ADAPTED FOR PRESSURE FILLING

Douglas F. Corsette, 6559 Firebrand St., Los Angeles, Calif. 90045

Filed Jun. 8, 1983, Ser. No. 502,272

Int. Cl.³ B05B *11/00*

U.S. Cl. 222—321 **14 Claims**



1. A dispensing pump of the pressure accumulating type, comprising a pump body having an upstanding stationary piston, said body being adapted for securement in a fluid tight manner on a container of product to be dispensed, reciprocable plunger means comprising an annular plunger resiliently urged

into a fully raised position above said pump body and being mounted on said piston for reciprocation to define therewith a variable volume pump chamber, a valve controlled inlet passage in said piston, said plunger means further comprising a plunger head slideably disposed on said plunger for reciprocation and having means defining a variable volume accumulation chamber in open communication with said pump chamber, said head having a discharge passage adapted to be opened and closed upon relative movement by said plunger in response to a change in pressure within said pump chamber, means for limiting upward movement of said plunger head at a predetermined position wherein said plunger in said fully raised position functions as a valve for closing said passage, said body including a refill opening and an annular wall surrounding said piston and therewith defining together with said opening a refill passage for pressurized product, a skirt depending from said plunger means for reciprocation together therewith, said skirt having an annular resilient lip seal thereon in sealing engagement with an inner surface of said wall for closing said passage and for guiding said plunger means during reciprocation thereof, said lip seal being deflectable away from said inner surface for thereby opening said passage in response to a charge of pressurized product applied to the outer surface of said lip seal during a charge operation.

4,503,998

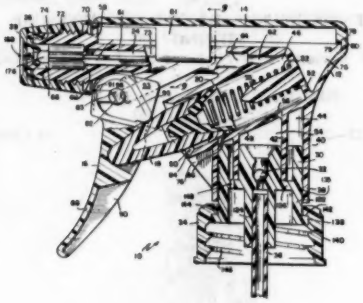
TRIGGER SPRAYER

Douglas S. Martin, Lawrenceville, Ga., assignor to Universal Dispensing Systems, Inc., Atlanta, Ga.

Continuation-in-part of Ser. No. 423,623, Sep. 27, 1982, Pat. No. 4,480,768, which is a continuation-in-part of Ser. No. 395,685, Jul. 6, 1982,. This application Mar. 4, 1983, Ser. No. 472,152

Int. Cl.³ B65D *47/34*

U.S. Cl. 222—341 **5 Claims**



1. A hand-operated pump for dispensing a fluid from a container, the pump comprising a body containing an inlet chamber, an outlet chamber, and a pumping cylinder having an open end and a closed end, the pumping cylinder being connected to the inlet and outlet chambers near the closed end of the pumping cylinder, the outlet chamber projecting forwardly from the pumping cylinder and terminating in a nozzle assembly, a piston reciprocably mounted in the pumping cylinder, biasing means for urging the piston toward the open end of the pumping cylinder, and trigger means pivotally mounted to the body and contacting the piston for moving the piston within the cylinder from a rest position against the urging of the biasing means, the trigger means having a forward surface defined by a web and a plurality of triangular supports co-joined to form a tapered socket receiving the outer end surface of the piston at the back of the web.

4,503,999

DISPENSING VALVE ASSEMBLY FOR A PRESSURIZED CONTAINER

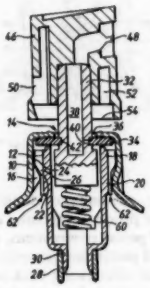
Leonard I. MacNair, Greenford, and Gary Fishlock, Swindon, both of England, assignors to Metal Box p.l.c., Reading, England

Filed Aug. 3, 1982, Ser. No. 404,775

Claims priority, application United Kingdom, Aug. 6, 1981, 8124007

Int. Cl.³ B65D *83/14*

U.S. Cl. 222—402.16 **9 Claims**



1. A dispensing valve assembly for a container for a pressurised product, comprising a cup adapted for mounting the assembly to a container body, valve means including a valve housing having a head thereon which lies inside the cup, the valve means further including a resilient sealing member located between the head and an end wall of the cup, the cup having a side wall formed with radially inwardly extending internal projections which engage an undersurface of the head to urge the valve housing axially against the sealing member and thereby hold the sealing member in compression against the end wall of the cup, the internal projections having crests at their radially inward extremities the valve housing further having a tubular portion which is integral with and coaxial with the head and which extends axially away from the head beyond the said undersurface thereof, the tubular portion having a radially outer surface which is substantially cylindrical, the internal projections engaging the said substantially cylindrical radially outer surface with their crests so as to restrain movement of the housing relative to the cup in the radial direction, there being a propellant inlet arranged to permit entry of pressurised propellant fluid from outside the cup to a region between the inner surface of the cup and the exterior of the valve housing, wherein said tubular portion of the housing is formed so as to provide a plurality of flow paths along which propellant fluid from said region flows past the projections, which flow paths are sufficiently narrow, in the circumferential direction and relative to the width of the projections in that direction, that irrespective of the angular orientation of the housing relative to the cup the crests of the projections engage with said substantially cylindrical radially outer surface without substantially restricting said flow paths but sufficiently firmly so as, in combination with the said engagement of the internal projections with the said undersurface of the head, to secure the housing against movement within the cup in properly positioned relation thereto.

4,504,000

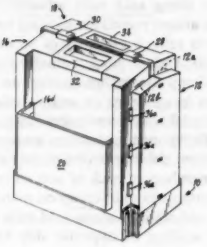
SEWING BOX

John S. Doyel, 404 W. 20th St., New York, N.Y. 10011

Filed Feb. 11, 1983, Ser. No. 465,791

Int. Cl.³ A45F *3/48*

U.S. Cl. 223—107 **6 Claims**



1. A sewing box comprising:

a rectangular central tray having a bottom and left, right, front, and back sidewalls extending up therefrom;

rectangular left and right sidetrays pivotally secured to the central tray's left and right sidewalls, respectively, to move between their open positions, at which they extend away from the central tray and each other, and their closed positions, at which they extend up from the central tray;

rectangular front and back spool panels pivotally secured to the central tray's front and back walls, respectively, to move between their open positions, at which they extend away from the central tray and each other, and their closed positions, at which they extend up from the central tray and adjoin at their top ends;

wherein said sidetrays and spool panels are shaped and dimensioned to form, with the central tray, a closed box when in their closed positions, and to form a cross-shaped configuration when in their open positions;

said sidetrays and spool panels having snaplocking interlock means normally preventing a sidetray from moving away from its closed position while the spool panels remain closed, said interlock means being released, to allow a sidetray to move away from its closed position, either when the spool panels are opened or when the sidetray is selectively and temporarily deformed by hand while the spool panels remain closed, and said interlock means being engaged, to keep a sidetray in its closed position, either by closing one or both spool panels while the sidetray is in its closed position, or by snaplocking the sidetray into an engagement with one or both closed spool panels by pressing it toward and into its closed position, whereby the sidetrays are normally secured at their closed position when the box is closed for storage or transportation, but can be opened and closed selectively whether or not the spool panels are opened;

a manually operable slide lock mounted on each spool panel to move between a locked position at which it engages the other spool panel when the panels are in their closed positions, to thereby lock the panels to each other, and an open position at which it does not engage the other spool panel and allows the closed box to be opened;

wherein each of the central tray, sidetrays and spool panels is integrally molded from thermoplastic material, and including hinge pins integrally molded as a part of the respective sidetrays and spool panels and hinge openings integrally molded in the central tray to receive said pins, to thereby pivotally secure the sidetrays and the spool trays to the central tray, said hinge openings having been molded without the use of hole-forming movable cams, and the two sidetrays are identical to each other and interchangeable and the two spool panels are also identical to each other and interchangeable, and wherein the recited components are assembled into the recited box by snaplock connections and without fasteners or adhesives.

4,504,001

SWIVEL CONNECTED BELT HOLSTER

Richard D. E. Nichols, Fallbrook, Calif., assignor to Bianchi International, Temecula, Calif.

Filed Aug. 1, 1983, Ser. No. 519,049

Int. Cl.³ B41C *33/02*

U.S. Cl. 224—198 **8 Claims**

1. An angle selectable belt loop supported holster comprising:

a holster body of leather or leather-like material defining a handgun carrying pouch;

a belt loop assembly for attaching to a wearer's belt;

means for securing the belt loop to the holster body for selectably angular positioning of the holster body with respect to the belt loop;

said securing means defining a central pivot about which the holster may be rotated with respect to the belt loop;

two part detent means for limiting the angular positions of said holster body when said securing means is engaged; and

two part snap means engaging said belt loop to open and close said belt loop, one of said two part snap means securing one part of said two part detent means to said belt loop between said belt loop and said holster body.

4,504,002

TRAMPER'S PACKS

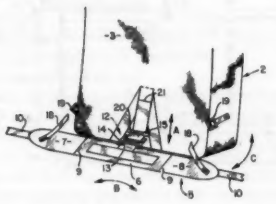
Robert E. Hall, Christchurch, New Zealand, assignor to Macpac Products (N.Z.) Limited, Christchurch, New Zealand

Filed Jul. 26, 1983, Ser. No. 517,377

Claims priority, application New Zealand, Aug. 30, 1982, 201751

Int. Cl.³ A45F *3/10*

U.S. Cl. 224—211 **4 Claims**



1. A tramper's pack incorporating a sac and a hip-belt se-

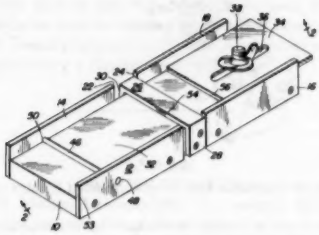
cured to the sac by a load-transmitting connection comprising a flexible member secured between substantially the midpoint of the width of the back of the sac and substantially the midpoint of the length of the hip-belt, said flexible member being dimensioned and arranged so as to permit relative movement between the hip-belt and the sac in at least three directions: twisting, up and down, and in a curved plane parallel to the plane of the wearer's back; said pack also incorporating a pair of stabilizer straps, each of which is adjustable in length; one stabilizer strap being releasably securable between one side of the hip-belt and the adjacent portion of the sac and the other stabilizer strap being releasably securable between the other side of the hip-belt and the adjacent portion of the sac.

4,504,003

APPARATUS FOR CUTTING CERAMIC TILE

Gerald W. Moody, 2007 Cedar, Jacksonville, Ill. 62650

Filed Mar. 2, 1983, Ser. No. 471,263
Int. Cl.³ B26F *3/00*
U.S. Cl. 225—96.5 **5 Claims**



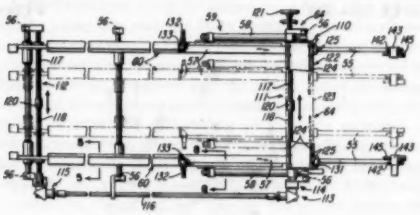
1. A tile cutter, a base having a top and opposite sides, a first pair of side walls shorter than the length of said base, each wall of said first pair of side walls secured one to each side of said base and having a portion extending above said top of said base and having an inner edge, a second pair of side walls shorter in length than said first pair of side walls, each wall secured one to each side of said base and having a portion extending above said top of said base and having an inner edge, a space between said inner edges of said first and second side walls, and abutment means on the top of said base extending between said secon pair of side walls for adjustable movement toward and away from said inner edges of said side walls for abutting a tile to be cut.

4,504,004

SHEET FORMING MACHINE

Carl P. Griesdorn, Cincinnati, Ohio, assignor to Planet Products Corporation, Cincinnati, Ohio

Filed Oct. 29, 1982, Ser. No. 437,568
Int. Cl.³ B65H *17/36*
U.S. Cl. 226—150 **3 Claims**



1. In a forming machine in which sheet material is advanced serially through a succession of working stations for physical modification of said sheet material; said machine comprising: a pair of spaced apart rails extending along said stations; a pair of first clamp assemblies each mounted on an associated one of said rails for reciprocating movements therealong; said first clamp assemblies grasping opposite side edge portions of said sheet material and upon moving said first clamp assemblies in one direction along said rails advance said sheet material through said stations; means for moving said first clamp assemblies along said rails; a plurality of second clamp assemblies mounted on said rails in longitudinally fixed relation; each of said second clamp assemblies having an upper and a lower clamp member for grasping an associated side edge portion of said sheet material transversely inwardly, independently, and in a non-interfering manner with an associated one of said first clamp assemblies; the improvement in which the upper and lower clamp members of each of said second clamp assemblies extend in a continuous uninterrupted manner substantially the full extent of said stations along said rails and provide preeise grasping and holding of opposite side edge portions of the sheet material along said full extent to enable modification of the sheet material at each successive station with optimum precision; said rails of said pair of rails being disposed in parallel relation; and further comprising; means for adjusting and holding the distance between said rails in a precise manner, said means for adjusting and holding comprising a plurality of sets of drive screws for adjusting the positions of said rails at a corresponding plurality of positions therealong, and a linkage system for connecting said plurality of sets of screws to enable adjusting all sets of screws in a simultaneous manner.

4,504,005

FILM PROCESSOR TRANSPORT ROLLER END PLUG

Dwane L. Moore, Wichita, Kans., assignor to Kreonite, Inc., Wichita, Kans.

Filed Sep. 22, 1982, Ser. No. 421,297
Int. Cl.³ B65H *17/20*; B65D *39/04*; G03D *3/08*
U.S. Cl. 226—190 **3 Claims**

1. A film processor transport roller end plug for providing a liquid seal in one end of a hollow film processor roller, the plug comprising:

an annular hollow plug housing, the housing having a first end portion and a second end portion, the first end portion having an outer circumference adapted for engaging the inner circumference of the processor roller and receipt therein, the second end portion providing a bearing surface adapted for receiving a gear or the like thereon;

an annular core having one end received in the first end portion of the plug housing, the other end of the core having a cam surface therearound;

an "O" ring received around the cam surface of the core; and

a threaded screw received through the plug housing and engaging a threaded nut inside the core, the screw when tightened inside the threaded nut securing the core to the

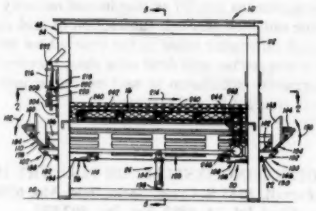
plug housing, the edge of the first end portion of the housing engaging the "O" ring and compressing it against the cam surface and against the inner circumference of the processor roller when the screw is tightened on the threaded nut providing a static seal and securing the plug to the hollow roller.

4,504,006

NAILER FOR NAILING AT LEAST ONE NAIL PLATE TO A MEMBER

Harvey N. Lollar, Sr., Reform, Ala., assignor to Kerr-McGee Chemical Corporation, Oklahoma City, Okla.

Filed Apr. 27, 1983, Ser. No. 488,978
Int. Cl.³ B25C *7/00, 5/02, 5/06*
U.S. Cl. 227—152 **14 Claims**



1. A nailer for nailing a nail plate to a member, a plurality of nails being secured to the nail plate and the member thereby nailing the nail plate to the member, the nailer comprising:

a support table having a portion adapted to receive and support the member;

a support frame connected to the support table for supporting the support table in a predetermined elevated position;

a holding assembly for holding the member in a predetermined position when the member is supported on the support table prior to nailing the nail plate to the member; and

at least one hammer assembly for applying a force to the nails to nail the nail plate to the member, comprising:

a hammer arm assembly pivotally secured to the support frame, the hammer arm assembly being pivotally moveable to a storage position and to a nailing position;

a hammer mover assembly connected to the hammer arm assembly for pivotally moving the hammer arm assembly to the storage position and to the nailing position; and

a hammer pivot assembly for moving the hammer arm assembly into engagement with the nails for driving the nails into the member when the hammer arm assembly is in the nailing position, thereby nailing the nail plate to the member.

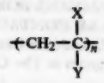
4,504,007

SOLDER AND BRAZE FLUXES AND PROCESSES FOR USING THE SAME

Herbert R. Anderson, Jr., Patterson; Constance J. Araps, and Richard A. Bates, both of Wappingers Falls, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

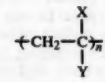
Filed Sep. 14, 1982, Ser. No. 417,966
Int. Cl.³ B23K *35/36*
U.S. Cl. 228—123 **13 Claims**

1. In a soldering process for joining a plurality of metal components wherein a flux is employed to promote said process, the improvement which comprises the step of using a flux purified of impurities which might leave a residue, said flux consisting essentially of dihydroabietyl alcohol or dihydroabietyl alcohol and a member selected from the group consisting of thermally depolymerizable polymers having the structure:



where X and Y are n-alkyl and iso-alkyl no exceeding 6 carbon atoms; halogen; —COOR where R is n-alkyl and iso-alkyl not exceeding 6 carbon atoms; phenyl, naphthyl, tolyl and methyl-naphthyl groups; n is 5 to 500, and mixtures thereof.

6. A brazing paste comprising a metalliferious powder dispersed in a fugitive fluxing binder purified of impurities which might leave a residue, said fugitive fluxing binder consisting essentially of dihydroabietyl alcohol or dihydroabietyl alcohol and a member selected from the group consisting of thermally depolymerizable polymers having the structure:



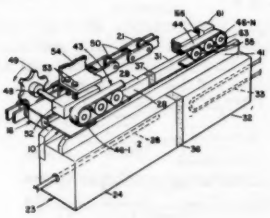
where X and Y are n-alkyl and iso-alkyl not exceeding 6 carbon atoms; halogen; —COOR where R is n-alkyl and iso-alkyl not exceeding 6 carbon atoms; phenyl, naphthyl, tolyl and methyl-naphthyl groups; n is 5 to 500, and mixtures thereof.

4,504,008

METHOD AND APPARATUS FOR REFLOWING SOLDER STRIPES ON ARTICLES

William C. Kent, and Charles H. Payne, both of Garland, Tex., assignors to AT&T Technologies, Inc., New York, N.Y.

Filed Jun. 2, 1983, Ser. No. 500,588
Int. Cl.³ B23K *31/02, 1/00*
U.S. Cl. 228—180.2 **12 Claims**



1. An apparatus for reflowing solder coated on one of a pair of abutting elements, which comprises:

a first heat conductive rail;

means for heating said first rail to a temperature slightly above the melting temperature of the solder;

a second heat conductive rail aligned with said first rail;

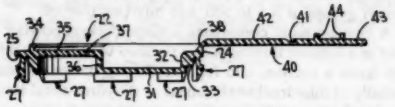
means for maintaining the temperature of the second rail below the melting temperature of the solder; and

means for engaging and sliding said elements along said first and second rails at a speed that allows the solder to melt during movement of said elements along the heated rail and allows the solder to cool and solidify during movement of said elements along said second rail.

4,504,009
CLOSURE HAVING MEANS FOR RETENTION IN TUBULAR CONTAINER

Elmer J. Boik, Lombard, and Frederick P. Marshall, Park Forest, both of Ill., assignors to The Continental Group, Inc., Stamford, Conn.

Filed Jun. 24, 1980, Ser. No. 162,561
Int. Cl.³ B65D *3/10*
U.S. Cl. 229—5.5 **12 Claims**

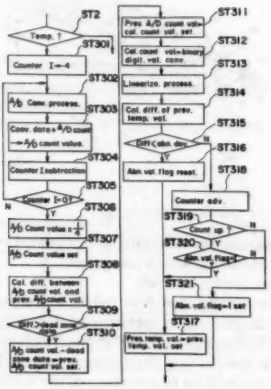


1. An end closure for tubular container bodies, said end closure comprising an end panel having axially inner and outer surfaces, said axially inner surface including a peripheral radially outer surface area for engaging in abutting relation an extreme end of a container body, and retaining means projecting from said axially inner surface, said retaining neans being in the form of peripherally spaced lugs, each of said lugs having a separate resilient connecting portion joined to said end panel within the confines of said peripheral area, each of said lugs including an anchoring head carried by said connecting portion and having a cam surface adjacent a free end thereof for engagement with a container extreme end to position said lugs, said cam surface having a radially inner portion thereof lying within an axial projection of said peripheral surface, said anchoring head also including a roughened anchoring surface lying intermediate said cam surface and said connecting portion and generally lying within said axial projection of said peripheral surface and a depending centering lug disposed between each pair of said lugs.

4,504,010
TEMPERATURE CONTROL DEVICE

Yasuyuki Sukimoto, Yahata, and Toshiaki Nagao, Muko, both of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Filed May 16, 1983, Ser. No. 494,894
Claims priority, application Japan, May 17, 1982, 57-83674
Int. Cl.³ F23N *5/20*
U.S. Cl. 236—46 F **5 Claims**

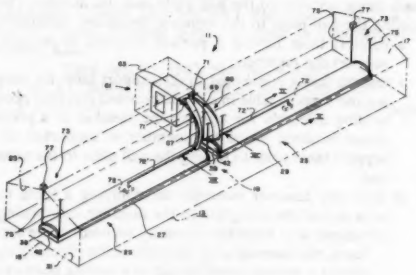


1. In a temperature control device comprising means for detecting temperature of an object to be controlled, an A/D converting means for converting analog amount from said temperature detecting means into digital amount, a target value setting means, an operation unit for effecting predetermined calculation based on the digital amount from said A/D converting means and the target value from said target value setting means, and an output control section for applying a predetermined control amount to said object based on result of the calculation by said operation unit, the improvement comprising means for obtaining an average value of the digital output amount from said A/D converting means, means for obtaining a difference value between said digital output amount average value thus obtained and a digital output amount average value previously detected and separately stored, means for comparing said difference value with a predetermined dead zone data value, and means for setting in a memory a digital output amount the same as the previous digital output amount in the case where said difference value is smaller than said dead zone data value in the comparison by said comparing means and for setting in said memory a digital amount value obtained through subtraction of said dead zone data from said difference value in the case where said difference value is larger than said dead zone data, thereby to effect the predetermined calculation at said operation unit by said digital output thus set in said memory.

4,504,011
AIR CONDITIONING SYSTEM FOR POULTRY HOUSES

Ronald A. Farrell, 1043 S. Craig, Springfield, Mo. 65804

Filed Jul. 29, 1982, Ser. No. 402,895
Int. Cl.³ A01K *41/02*
U.S. Cl. 237—14 **1 Claim**



1. Air conditioning system for a house comprising said air conditioning system a plenum means for extending substantially the entire length of the house and air conditioning means for forcing conditioned air through said plenum means, said plenum means including a first plenum chamber and a second plenum chamber, said first plenum chamber having an opened bottom, said air conditioning means including a conduit means for allowing conditioned air to enter said second plenum chamber, said second plenum chamber being movable between an expanded position when air is being forced therethrough and a collasped position when air is not being forced therethrough, said plenum means including control transfer means for allowing conditioned air to pass from said second plenum chamber to said first plenum chamber at a controlled rate, said control transfer means includes an elongated channel member extending lengthwise of said plenum means and located between said first and second plenum chamber, said channel member having a plurality of spaced-apart apertures therethrough for allowing air to pass from said second plenum chamber to said first plenum chamber; and in which said control transfer means includes a slide member provided adjacent said channel member for selectively closing portions of said apertures through said channel member to control the flow of air therethrough, said slide member having a plurality of spaced-apart apertures therethrough that substantially correspond in size and spacing to said apertures through said channel member.

4,504,012

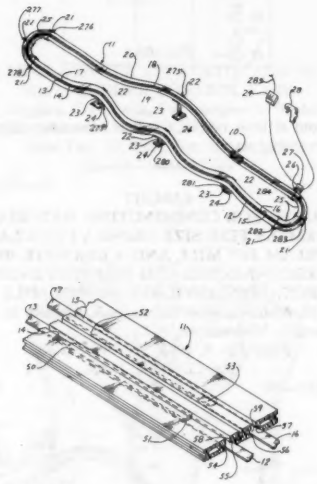
TOY ROADWAY SYSTEM

Warren N. Fetty, and Rosabelle M. Fetty, both of P.O. Box 306, Altadena, Calif. 91001

Division of Ser. No. 142,001, Apr. 21, 1980, Pat. No. 4,352,392. This application Jun. 28, 1982, Ser. No. 393,021

Int. Cl.³ A63H *18/12;* **E01B** *23/00*

U.S. Cl. 238—10 F **10 Claims**



1. A roadway comprising

a length of flat material defining a straight roadway section providing a flat upper surface and spaced side edge surfaces, said flat upper surface having downwardly directed recessed means extending longitudinally of the length of material, the material being relatively rigid transversally of the material and relatively flexible longitudinally of the material for ease of abrupt upward and downward bending;

flexible electrically conductive strip means mounted horizontally flat in said recessed means, said recessed means including inwardly protruding overlapping flanges, the strip means being freely and independently slidable in said recessed means exposing a continuous conductive surface the length of the roadway;

an attachable means inwardly directed along each side edge of the roadway along the entire length thereof for use when attaching the roadway sections together;

a connector means having inwardly protruding means for endways engaging with the attachable means; and

a support means having resilient clamping means for engaging with the attachable means of the length of roadway.

4,504,013

APPARATUS FOR DISCHARGING TWO COMMINGLED FLUIDS

David C. Huffman, Wilton, N.H., assignor to Spraco, Inc., Nashua, N.H.

Filed Aug. 23, 1982, Ser. No. 410,590

Int. Cl.³ B05B *7/06*

U.S. Cl. 239—424 **8 Claims**

1. In a spray head, apparatus comprising,

a unitized body having an exterior and exposed flat face generally perpendicular to opposed first and second end faces extending from said first end face to said second end face, said body also having a first inlet passage for a fluid extending from said first end face generally parallel to said flat face and a second inlet passage for a different fluid extending from said second end face generally parallel to said flat face,

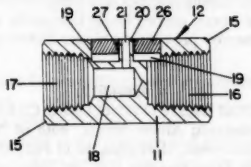
said passages being located in the body inwardly with respect to said flat face and out of communication with each other,

a cylindrical chamber in the body extending from said flat face inwardly thereof and being open at its top,

said chamber being in communication with one only of said inlet passsages,

a post having an inlet and an outlet,

a nozzle mounted from the chamber about the exterior of said post outlet in said chamber and having an open portion functioning as a discharge passage from said chamber,



said post being integral with the body and extending therefrom into said chamber and also into said nozzle open portion in laterally spaced relation to both the chamber and the nozzle open portion,

said post terminating at the plane of said flat face and having a flow-confining jet-producing passage extending through the post from the post inlet to the post outlet at its terminus at said plane for discharge of fluid from an area of communication with only the other of said inlet passages,

said flow-confining jet-producing passage having the form of a hollow unobstructed cylinder between the post inlet and post outlet,

said post inlet being in direct communication with said other of said inlet passages.

4,504,014

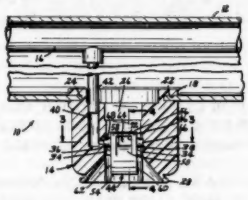
DEVICE FOR ATOMIZING A LIQUID

Wilfred D. Leuning, Sioux Falls, S. Dak., assignor to D & W Industries, Inc., Sioux Falls, S. Dak.

Filed Jan. 31, 1983, Ser. No. 462,323

Int. Cl.³ B05B *7/00, 15/00*

U.S. Cl. 239—433 **4 Claims**



1. A device for atomizing a liquid, comprising:

means, attached to a boom, for confining air from an air source;

a sprayhead attached to said boom, said sprayhead including first and second elliptical nozzles superimposed on and orthogonally oriented with respect to one another, said

sprayhead nozzles being in fluid communication with the air in said confining means;

a first wing with a substantially symmetrical first profile, said first wing having a top and a bottom, said first wing having first leading and first trailing edges, said first wing having a first opening extending through from said top to said bottom, said first opening having a side forming a second leading edge for a second wing, said second wing having a substantially symmetrical profile extending from said second leading edge to meet and conform to the first profile of said wing, one of said first and second elliptical nozzles having an axis aligned with said first and second wings;

means for attaching said first wing within said sprayhead; and

means for directing a single jet of liquid into said first opening;

whereby the aligned elliptical nozzle helps expand air flow along the trailing edges of said wings while the orthogonal elliptical nozzle carries liquid outwardly away from said wings thereby providing a bigger distribution pattern.

4,504,015

METHOD FOR DESTROYING USED CARBON RIBBON

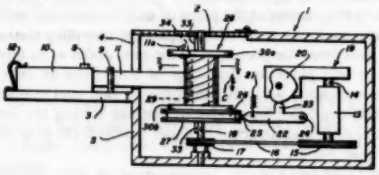
Heinrich Meinhardt; Alfons Berger, both of Nuremberg, and Harald Zimmerman, Herrieden, all of Fed. Rep. of Germany, assignors to Triumph-Adler A.G. fur Buro und Informationstechnik, Nuremberg, Fed. Rep. of Germany

Filed Sep. 20, 1982, Ser. No. 420,131

Claims priority, application Fed. Rep. of Germany, Sep. 10, 1981, 3135897

Int. Cl.³ B02C *19/12*

U.S. Cl. 241—3 **2 Claims**



1. A method for destroying used carbon ribbons by shredding comprising the steps of

spirally winding a multilayered coil of ribbon on a core of a reel by securing one end of a used carbon ribbon to a rotating and axially oscillating reel, and, after the ribbon is wound on the core of said reel and while the reel is rotating and axially oscillating,

urging a cutter toward and transverse the core of said reel, thereby to cut through the multilayered sprially wound coil of used carbon ribbon and to throw off a multitude of individual trapezoidal shaped segments resulting from the cutting.

4,504,016

PROCESS FOR CLEANING CHEMICAL CELLULOSE PULP BY SCREENING AND APPARATUS

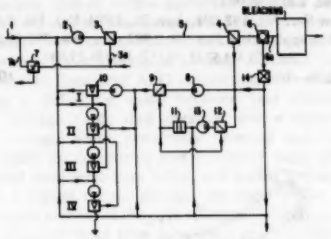
Nils A. L. Wikdahl, Bravallavagen 42, S-182 64 Djursholm, Sweden

Filed Jul. 1, 1983, Ser. No. 510,469

Int. Cl.³ B02C *23/08;* **B03B** *7/00;* **D21H** *5/00*

U.S. Cl. 241—24 **19 Claims**

1. A process of cleaning a chemical cellulose pulp suspension, which comprises screening the chemical pulp in a first fine screening stage; leading the accepts to further processing and rescreening the rejects in a second fine screening stage; leading the accepts from the rescreened rejects to at least one hydrocyclone stage; and recycling at least part of the accepts from the hydrocyclone stage to the first screening stage; refining at least part of the rejects from the second screening stage; and combining at least part of the refined rejects with the



rejects from at least one of the first screening stage and the second screening stage.

4,504,017

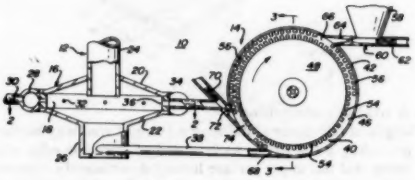
APPARATUS FOR COMMINUTING MATERIALS TO EXTREMELY FINE SIZE USING A CIRCULATING STREAM JET MILL AND A DISCRETE BUT INTERCONNECTED AND INTERDEPENDENT ROTATING ANVIL-JET IMPACT MILL

Norwood H. Andrews, Moorestown, N.J., assignor to Norandy, Incorporated, Moorestown, N.J.

Filed Jun. 8, 1983, Ser. No. 502,383

Int. Cl.³ B02C *19/06*

U.S. Cl. 241—40 **20 Claims**



1. Comminuting apparatus comprising:

(a) a discrete re-entrant circulating stream jet mill;

(b) a discrete rotating anvil-jet impact mill;

(c) said circulating stream jet mill and said rotating anvil-jet impact mill being functionally interconnected to comminute material to extremely fine sizes;

(d) said re-entrant circulating stream jet mill comprising a vortex chamber including an annular peripheral wall and opposed lateral walls, an axial outlet, and a vortex feed chamber closed at one end and opening at the other end into one of said lateral walls through an annular opening adjacent the jet tangent circle;

(e) said rotating anvil-jet impact mill comprising an impact chamber including an annular peripheral wall and opposed lateral walls, shaft means extending into said impact chamber and supporting a rotor thereon, said rotor including a plurality of anvils;

(f) raw material feed means for introducing uncomminuted material into said rotating anvil-jet impact mill;

(g) conduit means connecting an opening in the peripheral wall of said rotating anvil-jet impact mill to said vortex feed chamber, said conduit being connected to said impact mill so that material flows therefrom to said vortex feed chamber;

(h) fluid jet means for reinjecting fluid and material into said impact mill against and in a direction opposite to the direction of rotation of said rotor;

(i) second conduit means for connecting an opening in the peripheral wall of said circulating stream jet mill to said

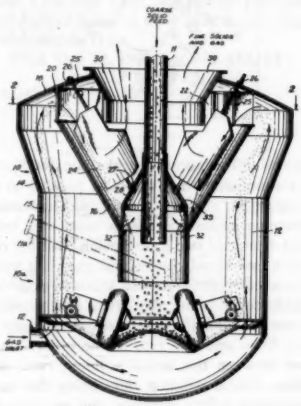
fluid jet reinjection means whereby partly ground material flows from the circulating stream jet mill to said reinjection means and is thereby injected into said impact mill.

4,504,018

PARTICLE CLASSIFIER APPARATUS AND METHOD WITH RUDDER CONTROL VANE

Joseph P. Diggins, Coraopolis, Pa., assignor to Foster Wheeler Energy Corporation, Livingston, N.J.

Filed Dec. 13, 1982, Ser. No. 449,054
Int. Cl.³ B04C 5/103
U.S. Cl. 241—53 **18 Claims**



1. A particle classifier for separating large particles from a mixture of small and large particles carried in a gas stream, comprising:

(a) a cylindrical vertically-oriented housing having an upper head and a central opening extending through said head for removal of gas carrying fine particles;

(b) multiple angled circumferentially-spaced upper vanes attached to said upper head for imparting a rotational motion to a gas-particle solids mixture passing therethrough;

(c) an inner conical shaped casing located below and attached to the lower ends of said multiple vanes, so as to provide an annular passageway between said housing and said conical casing for upward flow of the gas-solids mixture therethrough;

(d) multiple pivotable deflector vanes mounted radially inwardly from said conical casing, each vane being pivotable about its own longitudinal axis and inclined from the vertical and located entirely within the rotational flow path of the gas carried particles, whereby the pivot angle of each said vane is adjustable at an angle from a reference plane taken through the longitudinal axis of said pivotable deflector vane and the vertical center line of said housing, so as to control the flow velocity and degree of separation of the solid particles from the gas-particle mixture; and

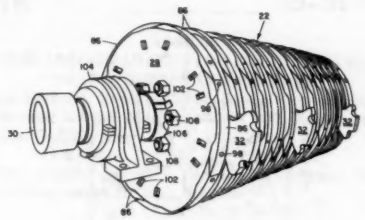
(e) at least one closeable opening located at the lower end of said conical casing for removal of the larger separated particles from the classifier.

4,504,019

HAMMER MILL HAVING CAPPED DISC ROTOR

Alton S. Newell; Alton S. Newell, Jr.; Paul D. Popovich, and John R. Ewing, all of San Antonio, Tex., assignors to Newell Manufacturing Company, San Antonio, Tex.

Filed Mar. 3, 1982, Ser. No. 354,286
Int. Cl.³ B02C 13/04
U.S. Cl. 241—73 **17 Claims**



1. An apparatus for shredding materials, comprising:

a base support;

a housing attached to said base support;

rotor means located in said housing, said rotor means having a plurality of discs located on a shaft one end of which extends external to said housing, said plurality of discs being spaced apart by spacing rings located on a radially spaced apart plurality of pins extending through said discs near an outer periphery thereof, said plurality of pins being generally parallel to said shaft;

a plurality of caps covering said outer periphery of said discs, said caps being removably attached to said discs, each of said caps comprising:

an arcuate outer surface with an external leading edge during rotation of said rotor means forming an obtuse angle and an external trailing edge during rotation of said rotor means forming an acute angle;

an inner surface having at least one undercut therein adapted to receive an outward protrusion of one of said discs, each of said discs having said outward protrusion periodically therearound, said outward protrusion being adapted to mate with said undercut in said cap, said discs having a hole in a center thereof adapted to receive said shaft therethrough and said discs having holes near said outer periphery adapted to receive said pins therethrough, said outward protrusions adapted to absorb impact during said shredding of said material;

means for attaching a plurality of said caps to each of said discs to permit removable attachment of each of said caps to one of said discs;

said caps having ends adapted to overlap end-to-end when said caps are attached to said discs for protecting said outer periphery of said discs;

feeding means including roller means for feeding materials to be shredded into said housing through an inlet opening, said feeding means having a declining approach to said inlet opening;

anvil means located at said inlet opening for shredding materials passing therethrough upon hammers carried on said pins of said rotor means passing contiguous therewith, said hammers being free to rotate on said pins;

power means external of said housing for turning said rotor means via said end of said shaft which extends external to said housing;

outlet means for said housing to discharge shredded materials from said housing, said outlet means having grate means therein to insure said shredded materials have been shredded to a predetermined size prior to discharge; and

conveyor means for removing the shredded materials for further processing after said discharge from said housing.

4,504,020

PULVERIZING MILL APPARATUS

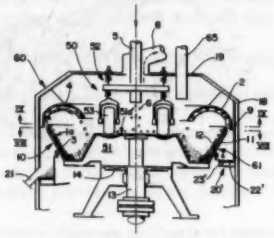
Toyomi Nishida; Takeshi Suzuki, both of Kobe; Takashi Hatamori, Miki, and Sei Terada, Kobe, all of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan

Filed Jun. 16, 1982, Ser. No. 389,145

Claims priority, application Japan, Jun. 20, 1981, 56-95580; Jun. 27, 1981, 56-99886

Int. Cl.³ B02C *17/02*

U.S. Cl. 241—121 18 Claims



1. A pulverizing mill apparatus comprising:

a base rotatable with a vertical rotary shaft;

an annular rotary container having an outer inclined side wall of substantially inverted frustoconical shape, said container being located at the outer periphery of said base, said inclined side wall being formed with a plurality of linear slits for discharging therethrough particles of pulverized material, each of said slits having an opening of a width smaller than the size of the members of the grinding media;

a fixed cover secured to a machine frame and arranged in a manner to enclose an upper portion of said annular rotary container, said fixed cover having a plurality of guide vanes attached to its inner surface;

grinding media for the pulverizing of coarse material, said grinding media being contained in said annular rotary container;

said container also including conical pulverizing means operative to perform pulverizing of material to be pulverized by the circulatory behavior of said grinding media, said conical pulverizing means being concentrically disposed within said outer inclined side wall;

coarse crushing means comprising at least one roller arranged to press against an upper surface of said base serving as a crushing tray; and

a casing secured to said machine frame to enclose said pulverizing means and said coarse crushing means.

4,504,021

RIBBON FREE WOUND YARN PACKAGE AND METHOD AND APPARATUS FOR PRODUCING THE SAME

Heinz Schippers; Erich Lenk; Gerhard Martens; Manfred Mayer, all of Remscheid; Werner Pieper, Radevormwald, and Siegfried Putsch, Wuppertal-Cronenberg, all of Fed. Rep. of Germany, assignors to Barmag Barmer Maschinenfabrik AG, Remscheid, Fed. Rep. of Germany

Filed Mar. 18, 1983, Ser. No. 476,852

Claims priority, application Fed. Rep. of Germany, Mar. 20, 1982, 3210244; May 3, 1982, 3216334; May 11, 1982, 3217562; May 27, 1982, 3219880

Int. Cl.³ B65H *54/38*

U.S. Cl. 242—18.1 6 Claims

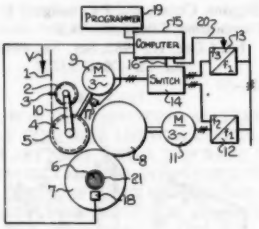
1. An apparatus for winding a textile yarn into a core supported package and including means for rotating the core to wind the yarn thereabout at a substantially constant rate, yarn guide means movable axially of the core for guiding the yarn onto the core, and means for traversing said yarn guide means and including a drive shaft and a grooved drum mounted for rotation about the axis of said drive shaft, and wherein the winding ratio (F), which is defined as the ratio of the rotational speed of the package (NS) to the double stroke rate of the yarn guide (NC), gradually decreases as the package builds, the improvement therein comprising

means for storing a plurality of predetermined critical winding ratios (FSP) at which undesirable pattern formations would normally occur,

means for storing a predetermined safety distance (S) from each of said critical winding ratios,

means for continuously comparing the actual winding ratio with the stored critical winding ratios, and

drive control means for selectively operating said traversing means at one of either an initial double stroke rate (NCA),



or a second difficult double stroke rate (NCS), and including a transmission shaft disposed parallel to said drive shaft, means for rotating at least said transmission shaft, first coupling means operatively connected between said grooved drum and said transmission shaft for rotating the drum at a first speed, and second coupling means operatively connected between said grooved drum and one of said shafts for rotating the drum at a second different speed, and such that the double stroke rate may be rapidly changed from said one rate to the other rate upon the distance between the actual winding ratio and an approaching critical winding ratio being the same as said predetermined safety distance, and so that the actual winding ratio moves rapidly through such critical winding ratio.

4,504,022

THREAD FEED MECHANISM AND METHOD FOR TEXTILE MACHINES

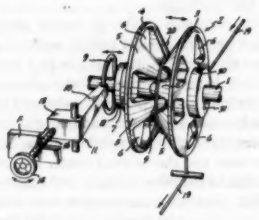
Hans-Peter Stang, Wuppertal-Strasse 31, and Dieter Fischer, Wuppertal-Strasse 6, both of D-5550 Bernkastel-Kues, Fed. Rep. of Germany

Filed Mar. 1, 1983, Ser. No. 471,562

Claims priority, application European Pat. Off., May 5, 1982, 82103867.6

Int. Cl.³ B65H *51/00*

U.S. Cl. 242—47.01 7 Claims



1. In thread feed mechanism for textile machines including a

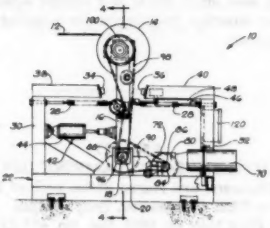
drive shaft, means for rotating the drive shaft and a thread feed roller separate from the drive shaft rotating means and having two separate side-by-side discs mounted on such shaft, each of such discs having circumferentially spaced fins extending inward toward the other disc and inclined toward the shaft, the inner end portions of the fins of the two discs being interdigitated to form a thread-receiving valley between them flared outward from its base, the improvement comprising one of the discs being fixed to the drive shaft and the other disc being fitted on the shaft so as to be slidable axially therealong, and adjustment means mounted on the textile machine for changing the axial position of such other slidable disc relative to such fixed disc while the drive shaft is rotating so as to change the effective circumference of the base of the thread-receiving valley between the discs and thereby change the thread feed rate without stopping the drive shaft and without changing the speed of rotation of the drive shaft.

4,504,023

APPARATUS PRODUCING CONSTANT CABLE TENSION FOR INTERMITTENT DEMAND

Ted Lauritzen, Lafayette, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed May 23, 1984, Ser. No. 612,955
Int. Cl.³ B65H *75/00*
U.S. Cl. 242—54 R **20 Claims**



1. Apparatus for maintaining constant cable tension during unreeling and reeling of electrical cable,

said apparatus comprising

a generally vertical swing frame,

a base,

pivot means for pivotally supporting the lower end of said swing frame on said base,

a rotatable cable reel for holding cable to be unreeled and reeled,

reel supporting means rotatably supporting said reel on the upper portion of said swing frame,

a rotatable drive shaft on said swing frame and coupled to said reel supporting means,

a rotary motor on said base,

a drive train connected between said motor and said drive shaft for transmitting torque to said reel to maintain tension on the cable during unreeling and reeling thereof,

said drive train including an electrically controllable variable torque slip clutch,

spring means connected between said swing frame and said base for biasing said swing frame toward an initial operating position,

a servo transducer connected to said swing frame for sensing the position thereof and for producing servo input signals when said swing frame is moved in either direction from said initial position,

a servo control system connected between said transducer and said clutch for regulating the torque transmitted by said clutch in relation to the signals from said transducer for maintaining said swing frame in said initial position,

at least one fluid cylinder connected between said base and said swing frame for counteracting the tension in the cable as it is unreeled and reeled from said reel,

and pressure regulating means for supplying a constant fluid pressure to said fluid cylinder to establish and maintain constant tension in the cable,

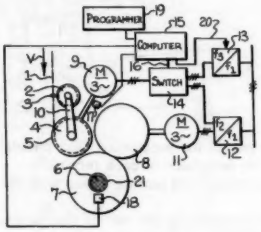
said servo system and said clutch being effective to produce torque on said reel in an amount sufficient to provide tension in said cable corresponding to the constant force exerted by said fluid cylinder.

4,504,024

METHOD AND APPARATUS FOR PRODUCING RIBBON FREE WOUND YARN PACKAGE

Siegmar Gerhartz, Remscheid, Fed. Rep. of Germany, assignor to Barmag Barmer Maschinenfabrik AG, Remscheid, Fed. Rep. of Germany

Filed Mar. 18, 1983, Ser. No. 476,623
Claims priority, application Fed. Rep. of Germany, May 11, 1982, 3217562; May 27, 1982, 3219880
Int. Cl.³ B65H *54/38*
U.S. Cl. 242—18.1 **15 Claims**



1. In a method of winding a textile yarn into a core supported package in which the yarn is wound about the core at a substantially constant rate while the yarn is guided onto the core by a traversing yarn guide, and wherein the winding ratio (F), which is defined as the ratio of the rotational speed of the package (NS) to the double stroke rate of the yarn guide (NC), gradually decreases as the package builds, the improvement therein comprising the steps of

determining a plurality of critical winding ratios (FSP) at which undesirable pattern formations would normally occur,

determining a safety distance (S) from each of said critical winding ratios,

selectively reciprocating the yarn guide at one of either an initial double stroke rate (NCA), or a second different double stroke rate (NCS),

oscillating at least one of the initial or second double stroke rates between maximum and minimum values over at least a portion of the winding cycle, and

rapidly changing the double stroke rate from said one rate to the other rate upon the distance between the actual winding ratio and an approaching critical winding ratio being the same as said predetermined safety distance, and so that the actual winding ratio moves rapidly through such critical winding ratio.

4,504,025

APPARATUS FOR WINDING AN ENDLESS TAPE

Robert Potts, R.R. #2, P.O. Box 111, Urbana, Ill. 61801

Filed Nov. 16, 1982, Ser. No. 442,015
Int. Cl.³ B65H *17/48*
U.S. Cl. 242—55.19 R **7 Claims**

5. A tape processing apparatus comprising:

a plurality of turntables;

means for drivingly supporting said turntables;

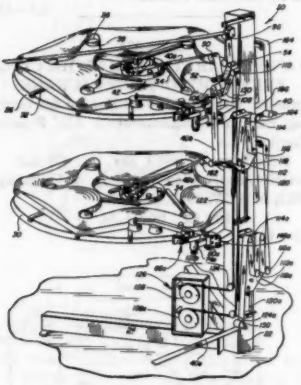
means on the surface of each turntable for frictionally re-

stricting the movement of the tape thereon during its winding on the turntable;

a sensing means associated with each turntable;

a multi-lobed cam secured to the bottom of each turntable;

means contacting said cam and responsive to relative movement of said cam for applying an undulating force to the tape adjacent the periphery of each turntable;



support means for supporting said undulating means adjacent the periphery of each turntable;

means coupling said sensing means with said support means; and

means for equalizing the rate of tape unwound from one of the turntables with the rate of the tape wound on the other turntable.

4,504,026

PHOTOGRAPHIC PAPER ROLLING APPARATUS

Moriyoshi Serizawa, Hachioji, and Haruo Hakamada, Tachikawa, both of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

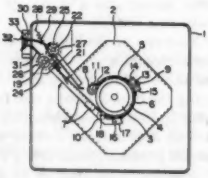
PCT No. PCT/JP82/00227, § 371 Date Feb. 8, 1983, § 102(e) Date Feb. 8, 1983, PCT Pub. No. WO82/04484, PCT Pub. Date Dec. 23, 1982

PCT Filed Jun. 11, 1982, Ser. No. 468,060

Claims priority, application Japan, Jun. 12, 1981, 56-91102

Int. Cl.³ G03B *1/04*

U.S. Cl. 242—71.1 **1 Claim**



1. A photographic paper rolling apparatus comprising

(a) a paper introduction port,

(b) a shutter to open and close said port,

(c) a rotatable core,

(d) upper and lower guides for directing paper to said rotatable core,

said upper and lower guides being mounted so that they are adapted to rotate in opposite directions to each other, said lower guide having a first roller mounted thereon at a point such that said first roller is contacting the periphery of said core when said lower guide is rotated into a first position, a first urging means for urging said lower guide into said first position, at least one secondary roller and secondary guide member, said secondary roller being attached to said lower guide via said secondary guide member, and a terminal roller attached to the distalmost portion of said secondary guide member, said secondary guide member and said at least one secondary guide roller and said terminal roller encircling said core, said secondary guide member including portions which are moveable relative to each other and toward and away from said core, and second urging means for urging said portions together toward said core, said first urging means being of sufficient force to overcome the weight of said lower guide but of insufficient force to overcome the combined weight of said lower guide, said second urging means, said at least one secondary roller, and said terminal roller, whereby when said lower guide and first roller are urged against said core, said first roller and terminal roller define an angle in excess of 180° around the axis of said core and as said photographic paper winds around said core, said angle decreases toward 180° thereby moving said secondary guide member and secondary roller away from said photographic paper until such time as said at least one secondary roller, secondary guide member and terminal roller fall off said photographic paper thereby forcing said lower guide to rotate in a first direction away from said core into a second position and means for simultaneously rotating said upper guide in a second direction opposite said first direction resulting in free-winding of said paper on said core.

4,504,027

MAGNETIC TAPE CLAMPING DEVICE

Masatoshi Okamura, and Haruo Shiba, both of Tokyo, Japan, assignors to TDK Corporation, Tokyo, Japan

Filed May 10, 1983, Ser. No. 493,237

Claims priority, application Japan, May 17, 1982, 57-70629[U]

Int. Cl.³ B65H *75/28*

U.S. Cl. 242—74.1 **4 Claims**

1. A magnetic tape clamping device for reducing injury to magnetic tape clamped to a reel hub in the event of imperfect attachment of said clamping device to said reel hub, said device comprising:

an upper band portion;

first and second legs formed at respective ends of said upper band portion;

an elastically deformable lower band portion connecting the lower ends of said legs, wherein said lower band portion comprises first and second edges and a central portion, each of said first and second edges extending longitudinally between said legs, and said central portion extending longitudinally between said legs; and

means for reducing an excessive force applied to said tape in the event of imperfect attachment of said clamp to said reel hub, said means comprising thicknesses of said first and second edges that are both less than the thickness of said central portion, whereby said means reduce injury to said tape in the event of imperfect attachment of said clamping device to said reel hub.

4,504,028

RECORDING TAPE CARTRIDGE

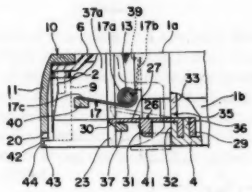
Shinichi Goto, Kyoto, Japan, assignor to Hitachi Maxell, Ltd., Osaka, Japan

Filed May 12, 1983, Ser. No. 494,046

Claims priority, application Japan, May 12, 1982, 57-69985[U]; Feb. 8, 1983, 58-17185[U]

Int. Cl.³ G03B *1/04;* G11B *15/32*

U.S. Cl. 242—198 1 Claim



1. In a recording tape cartridge comprising:

a cartridge case formed by a top section and a bottom section assembled together with a front face of the cartridge case opened,

a front lid member having a front plate with a recess formed in a lower end portion thereof and connecting members projecting rearward from both side end portions of said front plate, said front lid member being pivotally connected to said cartridge case in a manner capable of being opened and closed for closing the front face of the cartridge case,

a clearance defined between one of two side walls of said cartridge case and one of said connecting members opposing to said one side wall so as to face said recess,

and locking means for locking said front lid member in a closed condition, said locking means being provided with a pressed portion for engagement by a locking release member of a recording device and arranged in the above defined clearance so that said locking release member of said recording device entering said clearance through the recess of said front lid member is brought into contact with said pressed portion of said locking means for releasing said lid locking means, said clearance being formed with a wide front portion and a narrow rear portion having a boundary connected by a slanting surface for guiding entrance of said locking release means, said pressed portion of the locking means being arranged in said narrow rear portion.

4,504,029

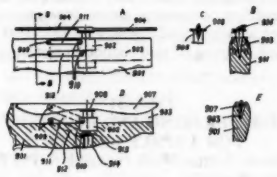
FLUID MOTOR DRIVEN MULTI PROPELLER AIRCRAFT

Karl Eickmann, 2420 Isshiki, Hayama-machi, Kanagawa-ken, Japan

Division of Ser. No. 121,186, Feb. 13, 1980, Pat. No. 4,405,103, Ser. No. 91,651, Nov. 5, 1979, and Ser. No. 973,780, Nov. 27, 1978, and a continuation-in-part of Ser. No. 425,747 Sep. 28, 1982, and Ser. No. 110,157, Jan. 7, 1980, said Ser. No. 91,651, is a division of Ser. No. 842,979, Oct. 13, 1977, which is a continuation of Ser. No. 610,871, Sep. 8, 1975, abandoned, which is a division of Ser. No. 416,237, Nov. 15, 1973, abandoned, which is a division of Ser. No. 131,782, Apr. 6, 1971, Pat. No. 3,790,105, which is a continuation-in-part of Ser. No. 782,349, Dec. 9, 1968, abandoned, which is a continuation-in-part of Ser. No. 551,023, May 18, 1966, abandoned, and Ser. No. 328,395, Dec. 5, 1963, Pat. No. 3,320,898, said Ser. No. 973,780, is a continuation-in-part of Ser. No. 760,006, Nov. 17, 1977, abandoned, which is a continuation-in-part of Ser. No. 487,272, Jul. 10, 1974, Pat. No. 4,009,849, which is a continuation-in-part of Ser. No. 104,676, Mar. 8, 1971, Pat. No. 3,823,898, said Ser. No. 425,747, is a continuation-in-part of Ser. No. 973,780, Ser. No. 760,006, and Ser. No. 487,272. This application Sep. 16, 1983, Ser. No. 533,073

Int. Cl.³ B64C *11/00*

U.S. Cl. 244—54 3 Claims



1. A fluid borne craft comprising, in combination, a laterally from a body extending airfoiled wing with a drive means to revolve a propeller which is mounted on said wing, wherein said drive means and said propeller are retractable into a portion of said wing and an improvement;

wherein

said improvement consists, in combination, in:

(a) a slot provided in said wing along the front portion of said wing and longitudinally parallel to said wing;

(b) a configuration of said slot complementary formed relative to the outer measures of the rear portion of said propeller;

(c) said propeller is provided with a means to change the angle of the pitch of said propeller from an angle of attack relative to the surrounding air to an angle parallel to the chord of said wing with the rear portion of said propeller directed towards said wing at said angle parallel to said chord; and;

(d) control means to retract said drive means and said propeller into said wing whereby said propeller when retracted into said wing is at least partially received in said slot and said control means extends said propeller out of said slot to be able to revolve in the fluid which surrounds said wing.

4,504,030

COOLING MEANS

John Kniat, Glastonbury; Joel F. Kuhlberg, New Hartford, and Daniel A. Mickey, Broad Brook, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

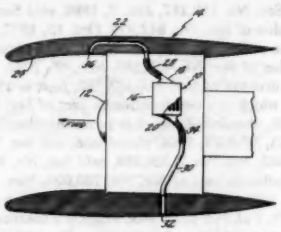
Filed Dec. 6, 1982, Ser. No. 447,361

Int. Cl.³ B64D *33/08;* F02K *3/04*

U.S. Cl. 244—57 3 Claims

1. Cooling means for an electronic package mounted on a gas turbine engine housed in a nacelle of an aircraft consisting

of a first connection means for interconnecting the electronic package and the inlet of the engine, a second connection means interconnecting said electronic package, said first connection means and the ambient overboard of said nacelle, the opening of said first connection means relative to said engine inlet and the opening of said second connection means relative to said ambient overboard being located relative to pressure gradients



acting on said nacelle and said inlet being selected so that the flow of air automatically flows from said opening of said first connection means and discharging through the opening of said second connection means and alternately from said opening of said second connection means and discharging through said opening of said first connection means dependent on the pressure gradients adjacent said opening of said first connection means and said opening of said second connection means.

4,504,031

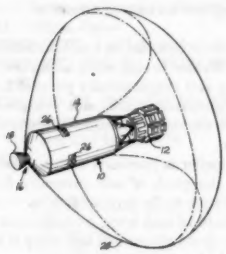
AERODYNAMIC BRAKING AND RECOVERY METHOD FOR A SPACE VEHICLE

Dana G. Andrews, Seattle, Wash., assignor to The Boeing Company, Seattle, Wash.

Continuation-in-part of Ser. No. 90,296, Nov. 1, 1979. This application Mar. 2, 1982, Ser. No. 353,828

Int. Cl.³ B64G *1/58*

U.S. Cl. 244—113 **19 Claims**



1. A method of recovering a space vehicle for reuse, comprising:

steering such space vehicle while it is in outer space, beyond a low earth orbit, for directing the space vehicle into a return path towards the earth's atmosphere, including orienting the space vehicle so that it will enter the earth's atmosphere main rocket nozzle end first;

extending an aerodynamic braking member that is carried by such space vehicle from a stowed position out into a large drag operational position in which it presents a large area braking surface which extends generally laterally outwardly from the space vehicle; and

operating the main rocket motor of the space vehicle to produce gases, regulating the flow rate of such gases out through the main rocket nozzle, so that the gases will flow back and outwardly to provide a cooling layer forwardly of the braking surface but without a substantial reduction in drag, whereby the braking surface will remain effective and the braking member will reduce the velocity of the space vehicle down to a desired level.

4,504,032

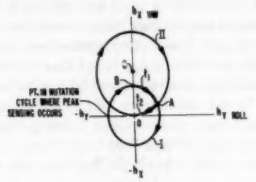
CONTROL OF NUTATION IN A SPACECRAFT

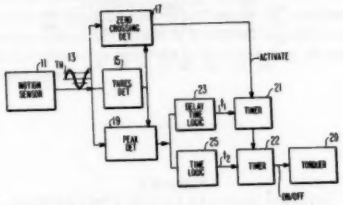
Kevin J. Phillips, East Windsor, and Terry G. Tracy, Cranbury, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Mar. 10, 1982, Ser. No. 356,824

Int. Cl.³ B64G *1/38*

U.S. Cl. 244—170 **3 Claims**





2. A method for reducing nutation of a momentum stabilized spacecraft to essentially zero in less than a single nutation period where said spacecraft has a spin axis, a torquer providing a torque value about a first arbitrary axis transverse to said spin axis and a characteristic nutation frequency comprising the steps of:

sensing the peak magnitude of nutation motion about said first axis;

starting a timer when the sensed nutational motion on said first axis reaches zero;

starting said torquer at said torquer value when said timer has timed out t_1 after the nutational motion reaches zero where t_1 is a function of said torque value, said sensed peak magnitude of nutational motion, and said characteristic nutation frequency; and

stopping said torquer after time t_2 where t_2 is a function of said torque value, said sensed peak magnitude of nutational motion, and said characteristic nutation frequency.

4,504,033

STABILIZING DEVICE FOR GYROSCOPE EFFECT APPARATUS SUCH AS A SPACE CRAFT OR VEHICLE, ESPECIALLY WITH A VIEW TO DAMPING THE NUTATION MOTION

Uwe Engelking, Katwijk Pays Bas, Netherlands, assignor to Agence Spatiale Europeenne, Paris, France

Continuation-in-part of Ser. No. 309,776, Oct. 8, 1981, abandoned. This application Jul. 10, 1984, Ser. No. 629,745

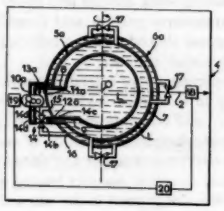
Claims priority, application France, Oct. 10, 1980, 80 21707

Int. Cl.³ B64G *1/38, 1/28*

U.S. Cl. 244—170 **25 Claims**

1. Gyroscope effect apparatus presenting a spin axis about which the apparatus is to spin, and comprising stabilizer means for damping nutation of said spin axis about an angular momen-

tum vector, characterized in that said stabilizer means comprises means defining a closed loop liquid flow path, pump means for pumping liquid round said flow path in periodic motion, detector means responsive to a parameter relating to the angle of nutation of said spin axis, and control means for controlling said pump means as a function of said parameter whereby to control the amplitude and phase of said periodic



motion of said liquid according to a law such that the overall angular momentum of said apparatus is conserved, whereby the component of angular velocity of said apparatus about said spin axis increases when the component of angular velocity perpendicular to said spin axis decreases, and whereby said liquid loop stabilizer means provides a lower threshold of nutation damping of about one order of magnitude lower than does a solid flywheel.

4,504,034

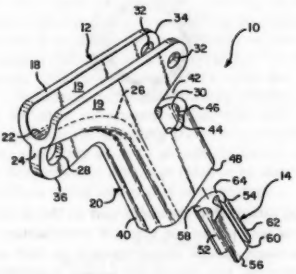
DEVICE FOR USE WITH HIGH CURRENT CARRYING ELECTRICAL CABLE

Walter M. Werner, Dowingtown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 262,006, May 8, 1981,. This application Nov. 10, 1981, Ser. No. 320,152

Int. Cl.³ E21F *17/02*

U.S. Cl. 248—63 **4 Claims**



4. A device for captivating a cable therein, said device comprising:

a. a body having a tapered opening therethrough to receive a cable and a wedge

b. said wedge being tapered having one side grooved to conformably slide along the cable and a slot extending along the length thereof and positioned between the grooved side and opposite side to define a resilient spring member so that as the wedge is driven into the opening with a cable positioned therein, the walls of the opening and the wedge cooperate to captivate the cable therein and further to resiliently deform the spring member into the slot so as to exert outward force against the wall of the opening to maintain continued pressure on the cable.

4,504,035

VIBRATION-DAMPED POWER TRANSMISSION DEVICE

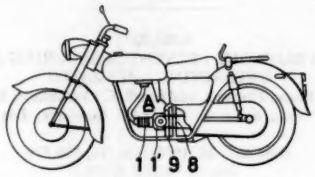
Masaki Hori, Tokyo, Japan, assignor to Seiko Giken Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 18, 1981, Ser. No. 331,996

Claims priority, application Japan, Dec. 27, 1980, 55-158013; Jul. 15, 1981, 56-109473

Int. Cl.³ F16M *13/00*

U.S. Cl. 248—559 **3 Claims**



1. A vibration-damped power transmission device adapted to transmit power from a prime mover such as motor, internal combustion engine and the like, which causes a vibratory motion, to a driven body, said power transmission device being supported on a support frame which is to be prevented from vibration, and vibration damper means disposed between the housing of said power transmission device and said support frame, each said vibration damper means comprising:

a horizontally extending mandrel;

a mass member having a cylindrical inner surface radially surrounding said mandrel; and

at least one damping coil spring coaxially between said mandrel and said cylindrical inner surface, each said spring consisting of at least one small coiled portion engaged with the outer surface of said mandrel, at least one large coiled portion engaged with said cylindrical inner surface of the mass member, and a conically coiled portion integrally connecting the small coiled portion to the large coiled portion for supporting a load directed transversely to the longitudinal extent of the coil spring.

4,504,036

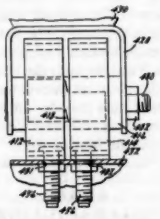
ENGINE MOUNT PRELOADED IN SHEAR

Wayne H. Passarell, Milford, and Jeffry A. Ziegler, Woodhaven, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Continuation of Ser. No. 159,997, Jun. 16, 1980, abandoned. This application Sep. 30, 1982, Ser. No. 429,368

Int. Cl.³ F16M *13/00*

U.S. Cl. 248—632 **8 Claims**



1. A vibration insulating mount comprising:

first and second mounting components rigidly connected to one of a supporting member or supported member;

a third mounting component rigidly connected to the other of the supporting member or supported member; and

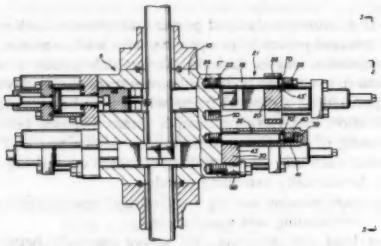
elastomeric pads abutting (i) one of said first and second mounting components and (ii) said third mounting component, and elastomeric pads abutting (i) the other of said first and second mounting components and (ii) said third mounting component said elastomeric pads constructed such that said pads abutting said first and third mounting components are no preloade or preloaded in shear and said pads abutting said second and third components are under a preload in shear of lesser magnitude than said pads abutting said first and third components when said mount is supporting said supported member.

4,504,037

RAM BLOWOUT PREVENTER SECURING AND RETRACTING APPARATUS

Clark W. Beam, Houston, and Mark K. Crutchfield, Kingwood, both of Tex., assignors to Hydril Company, Los Angeles, Calif.

Filed Sep. 26, 1983, Ser. No. 535,676
Int. Cl.³ E21B *33/06*
U.S. Cl. 251—1 A **9 Claims**



6. In a ram blowout preventer having a housing and a removable bonnet for inserting or withdrawing a ram assembly in the horizontal bore of the preventer, the improvement comprising,

two bonnet studs secured at their respective first ends in the blowout preventer housing and each having threaded external surfaces at their second ends, each stud having a substantially smooth surface between its two ends,

bearing means in the bonnet of the ram blowout preventer for slidingly supporting the bonnet on the smooth surface of the bonnet stud, and

two removable bonnet nuts, each having a cylindrical body with an open first end defining an engaging surface about the end of the nut and an internally threaded surface at its second end,

whereby when the bonnet is slid inwardly on said bonnet studs, the cylindrical body of each bonnet nut may be provided about the end of a respective one of the bonnet studs extending outwardly from the bonnet until the threaded surface at the second end of each bonnet nut threadingly makes-up with the external surface at the second end of each bonnet stud and the engaging surface at the end of each nut engages the bonnet thereby securing the bonnet to the blowout preventer housing, and

whereby the bonnet nuts may be unthreaded and removed from the bonnet studs, thereby freeing the bonnet to be slid outwardly on the bonnet studs.

4,504,038

VALVE ACTUATOR

Ottis W. King, 8534 E. 24th St., Tulsa, Okla. 74129

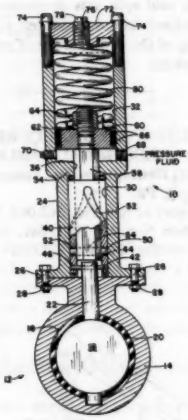
Filed Apr. 25, 1983, Ser. No. 488,064
Int. Cl.³ F16K *31/122, 31/126, 31/528*
U.S. Cl. 251—58 **7 Claims**

1. A valve having a valve body with a fluid passageway therethrough and a valve gate member rotatably positioned in said passageway, said gate member adaptable to close said passageway and to open said passageway when rotated to a different angular position, a stem member to which said gate member is supported and rotatably connected, an operator arranged to rotate said stem member and thereby said valve gate member, said valve operator comprising, in combination:

a tubular operator housing supported at one end thereof on said valve body with the tubular axis of said housing coincident with the axis of said valve stem member, said tubular housing being divided into lower and upper cylinders by a transverse portion, said transverse portion having a polygonal shaped opening coincident with said axis of said valve stem member;

a tubular coupling member rotatably positioned in said tubular housing in said lower cylinder thereof adjacent said valve body, said coupling member being affixed to said stem member whereby the rotation of said coupling member rotates said stem member and thereby said valve gate member, said coupling member having at least one elongated spiraled slot formed in the sidewall thereof;

a piston sealed relative to said upper cylinder and reciprocatable therein;



a piston rod attached at its upper end to the lower side of said piston, said piston rod being of cross-section substantially the same as and reciprocatable in said polygonal shaped opening, said piston rod having a portion thereof telescopically extending within said coupling member, said piston rod being supported in a torque resisting non-rotatable and axially displaceable manner in said operator housing transverse portion and the lower portion thereof being telescopically received in said tubular coupling member;

key means affixed to said piston rod extending into each of said spiraled slots formed in said coupling member whereby longitudinal movement of said piston and piston rod relative to said coupling member rotates said coupling member and thereby said valve gate member;

means to close the top of said upper cylinder, said housing being closed in its entirety from ambient environment; and

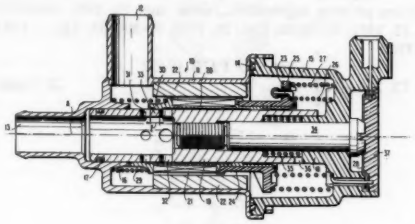
means to supply or remove pressure fluid into or from the said cylinder space above and below said piston to cause reciprocation thereof.

4,504,039

SOLENOID ACTUATED VALVE DEVICE

Motonobu Akagi, Kariya, Japan, assignor to Aisin Seiki Kabushiki of 1, Kariya, Japan

Filed Mar. 24, 1983, Ser. No. 478,584
Claims priority, application Japan, Mar. 24, 1982, 57-046512
Int. Cl.³ F16K *31/08*
U.S. Cl. 251—65 **2 Claims**



1. A solenoid actuated valve device for electrically controlling the flow of fluid comprising a body having an inlet port and an outlet port, a hollow core positioned within said body and having a first opening and a second opening for providing fluid communication between said inlet and outlet ports, a bobbin slidably mounted on said core and having a valve portion for controlling the effective area of said first and second openings, a solenoid coil wound on said bobbin, permanent magnet means mounted on said body so that the magnetic flux thereof intersects the windings of said solenoid coil at right angles thereto, magnetic means forming a magnetic circuit including said permanent magnet means in cooperation with said core so that forces are generated to cause said bobbin to move in opposite directions when electric current is applied to said coil in opposite directions, first spring means biasing said bobbin in one direction and second spring means biasing said bobbin in the opposite direction for maintaining said valve portion in a position intermediate said first and second openings in the absence of electric current being supplied to said coil wherein said first and second openings being spaced from each other by a portion of said core having no openings, the length of said portion of said core having no openings being of sufficient length so that in the operational position of said valve portion during the de-engergized condition of said coil said first opening will remain completely open and said second opening will remain completely closed, wherein said core is mounted for axial movement within said body and further comprising means for adjusting the axial position of said core relative to said body so as to accurately locate said prtion of said core between said openings relative to said valve portion on said bobbin when said coil is de-energized.

4,504,040

MULTIPLE STAGE VALVE

Richard W. Spils, 1900 Wildwood La., Anchorage, Ak. 99503

Continuation of Ser. No. 165,694, Jul. 3, 1980, Pat. No. 4,363,464. This application Jun. 21, 1982, Ser. No. 390,746
Int. Cl.³ F16K *47/04*
U.S. Cl. 251—121 **2 Claims**

1. A multiple stage valve comprising:

a body having plural seat members arranged in spaced relation along a predetermined axis and having first portions closer to said axis than other portions,

said seat members at least in part defining a flow passageway providing between said first portions spaced chambers larger than said first portions,

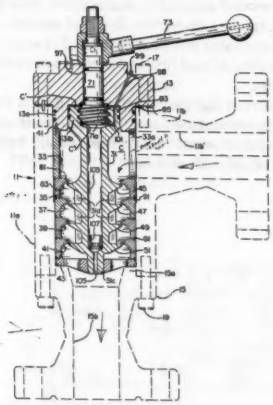
a coaxially related valve member in said passageway having plural spaced valve elements for cooperative action with said seat members,

said valve elements being capable of dropping into said chambers during assembly,

a guide ring beyond said seat members having a centering hole,

and guidance means on said valve member for engaging said seat members and keeping the valve elements from dropping into said chambers during assembly and for guiding said one end of said valve member into said centering hole,

said guidance means comprising plural webs extending radially and longitudinally for aiding in directing fluids flowing through said valve to move in a generally axial direction, rather than circumferentially, for aiding in assembly of the valve member into the valve body, and for guiding said valve member in its movement relative to said seat members,



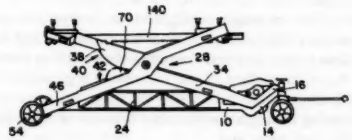
at least one of said webs being located on the periphery of said valve member and extending continuously and uninterruptedly to span the gaps between said valve elements.

4,504,041

WHEELED LIFTING APPARATUS

Dan Raz, Haifa, Israel, assignor to Electra Mikun (Industries) Ltd., Tel Aviv, Israel

Filed Nov. 13, 1981, Ser. No. 321,313
Claims priority, application Israel, Nov. 14, 1980, 61482; Jan. 8, 1981, 61881; Aug. 17, 1981, 63585; Aug. 17, 1981, 63586
Int. Cl.³ B66F *3/22*
U.S. Cl. 254—9 R **9 Claims**



1. Lifting apparatus comprising:

at least one scissors mechanism including:

a pair of scissor arms, at least one of said scissor arms having formed thereon a curved cam path; and

a cam disposed between said pair of scissor arms for engagement therewith and selectable separtion thereof for producing lifting operation of said scissors mechanism; and

load support means mounted onto said scissor arms for selectable positioning thereof; and

cable apparatus operative for producing selectable motion of said cams and comprising:

crank means;

a first winding reel operated by said crank means for winding a cable attached thereto;

a primary cable attached to said first winding reel for being selectably wound thereby;

first and second selectably positionable pulleys which are engaged by said primary cable for selectable positioning thereof; and

first and second secondary cables coupled to said respective first and second selectably positionable pulleys at a first end and engaging respective first and second ones of said cams for selectable positioning thereof in accordance with the positioning of said first and second selectably positionable pulleys;

wherein said curved cam path is configured such that a generally constant amount of force is required at all stages of separation of said scissor arms from a fully retracted to a fully raised orientation thereof.

4,504,042

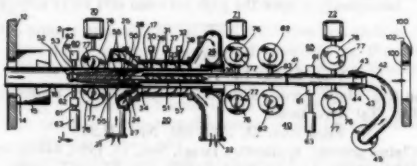
APPARATUS FOR HEAT TREATING STEEL

Frederick W. Kruppert, Goulais River, Canada, assignor to Kruppert Enterprises, Inc., Goulais River, Canada

Division of Ser. No. 348,694, Feb. 16, 1982, abandoned. This application Aug. 2, 1983, Ser. No. 519,705

Int. Cl.³ C21D *9/08, 1/62*

U.S. Cl. 266—115 **10 Claims**



1. An apparatus for segmentally cooling successive segments of preheated steel pipe comprising:

(a) a preheater for heating the steel pipe;

(b) a flow chamber configured to receive successive segments of the steel pipe from the preheater and adapted to flow selectively and continuously a cooling medium over the outer surface of the successive segments of the steel pipe;

(c) a plug having a diameter less than the internal diameter of the steel pipe; and

(d) an internal feeder having an inlet and an outlet, the outlet being located in the flow chamber and the internal feeder being adapted in conjunction with the plug to flow selectively and continuously a cooling medium over the inner surface of the same successive segments of steel pipe, at least one of said flow chamber and internal feeder being further adapted to control the flow of cooling medium such that the temperature of each segment can be lowered to a desired temperature in the flow chamber and thereafter controlled by using the inherent heat of the segment to vaporize substantially all of the cooling medium to create a vapor blanket along a surface of each segment so cooled to thereby control the temperature of the surface.

4,504,043

APPARATUS FOR COAL-GASIFICATION AND MAKING PIG IRON

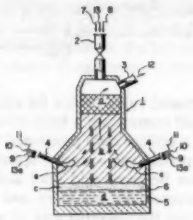
Hideyuki Yamaoka, Chiba; Michiharu Hatano, Sawara; Tomio Miyazaki, Hasaki; Teruhisa Shimoda, Itako, and Koji Oki, Omigawa, all of Japan, assignors to Sumitomo Metal Industries, Ltd., Osaka, Japan

Division of Ser. No. 372,147, Apr. 27, 1982, abandoned. This application May 24, 1983, Ser. No. 497,420

Claims priority, application Japan, Jun. 10, 1981, 56-89275; Jun. 22, 1981, 56-96390; Dec. 28, 1981, 56-209851; Apr. 2, 1982, 57-53703

Int. Cl.³ F27B *19/00*

U.S. Cl. 266—160 **25 Claims**



1. A melting/gasifying furnace for the production of pig iron and the gasification of fuel consisting essentially of:

(a) a furnace main of the shaft-like form,

(b) a top inlet for the introduction of reduced iron, coke and auxiliary materials and a gas outlet, which are provided in the top portion of said furnace main,

(c) outlets for the discharge of molten pig iron and slag provided in the bottom portion of said furnace main,

(d) a static coke-filled bed packed substantially with coke of the lump form provided in a major portion of said furnace main extending from the bottom of the furnace main up to the upper portion thereof, said bed including therein voids through which gas flows up in countercurrent contact with molten iron and slag which flows down,

(e) a tuyere or tuyeres for primarily blowing oxygen and fuel primarily comprising carbon and hydrogen, said tuyere(s) being provided in the side wall portion corresponding to the lower region of said coke-filled bed,

(f) a combustion zone or zones provided in front of said tuyere(s), directed toward the axis of the furnace main, and maintained substantially depletive of air to generate reducing gas,

(g) a melting section borne on the top of said coke-filled bed and comprising a stock of reduced iron, coke and auxiliary materials charged through said top inlet, the melting section allowing the reducing gas to flow up therethrough to melt therein the reduced iron by the sensitive heat of the reducing gas,

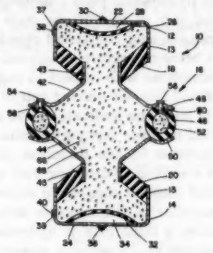
(h) a hearth formed in the lowermost region of said furnace main,

(i) wherein the blown fuel is gasified by the blown oxygen in said combustion zone(s) to generate the reducing gas primarily comprising carbon monoxide and hydrogen, the generated reducing gas flowing up throughout the coke-filled bed and the melting section, with the resultant molten iron and slag flowing down through the coke-filled bed resulting in pig iron to be collected in the hearth and to be discharged therefrom.

4,504,044
DRY VISCOUS SPRING DAMPER

Emile M. Shtarkman, Euclid, Ohio, assignor to Imperial Clevite Inc., Glenview, Ill.

Filed Oct. 25, 1982, Ser. No. 436,331
Int. Cl.³ F16F 13/00
U.S. Cl. 267—35 15 Claims

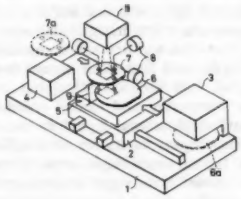


1. A viscous spring damper for carrying and leveling load and dampening structural agitation comprising a first housing member at least partially received in a second housing member and joined to said second housing member with an elastomeric shear spring, said spring damper having a first chamber separated from a second chamber by an elastomeric diaphragm, a first valve means foe selectively pressurizing said second chamber with pressurized gas, and a plurality of solid essentially incompressible in volume irregularly shaped elastomeric particles having particle sizes of about 30 mesh or smaller included in said first chamber and filling said first chamber at least to the extent that the particles interact one with another prior to the point of said shear spring being disposed over center, whereby relative movement between said members operates to stress said shear spring and vary the volumes of said first and second chambers thereby causing relative interaction between the solid incompressible individual particles thus promoting the characteristics.

4,504,045
WAFER TRANSFORMING DEVICE

Yukio Kenbo; Nobuyuki Akiyama; Mitsuyoshi Koizumi, all of Yokohama, and Asahiro Kuni, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 14, 1982, Ser. No. 434,397
Claims priority, application Japan, Oct. 19, 1981, 56-165772
Int. Cl.³ B25B 11/00
U.S. Cl. 269—21 9 Claims



1. A wafer transforming device wherein a wafer carried by vacuum sunction is transformed by pushing it up from a suction surface side thereof, the wafer transforming device comprising:

a base,

a hollow case supported by said base,

a diaphragm type chuck supported at an upper end of said case and having an upper surface formed with a suction groove,

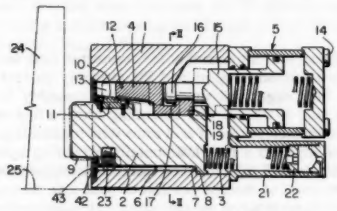
a large number of vertically moving elements which are arranged at predetermined intervals in predetermined positions within an airtight space that is defined by said base, said case and said chuck, and

drive means for selectively actuating the vertically moving elements.

4,504,046
RETRACTING CLAMP

Keitaro Yonezawa, and Tsutomu Sirakawa, both of c/o Aioi Seiki K.K., 9 Konoikekaidoshita, Itamishi, Hyogoken, Japan

Filed May 10, 1983, Ser. No. 493,211
Int. Cl.³ B23Q 3/08
U.S. Cl. 269—24 6 Claims



1. A retracting claim comprising:

a. a clamp housing having front and back ends defining a chamber therein, the chamber opening through the front end of the housing;

b. A fulcrum stopper defined by the housing within the chamber near the back end of the housing;

c. a clamp arm slidably disposed in the chamber so as to be movable between a retracted position and an extended position wherein it exerts a clamping force on a workpiece, the clamp arm having a fulcrum portion adjacent a first end which engages the fulcrum stopper at the limit of the arms extended position;

d. sloping wedge surface formed on a second end of the clamp arm, the surface sloping downwardly in a direction toward the back end of the housing;

e. retracting hook means formed on the clamp arm adjacent the first end thereof;

f. a wedge element disposed in the chamber between the sloping wedge surface and the housing so as to be slidable with respect to the housing and the clamp arm, the wedge element having a jaw portion to engage the retracting hook means;

g. compression spring means interposed between the clamp arm and the housing to bias the clamp arm toward its extended position; and

h. hydraulic cylinder means attached to the housing having a piston rod extending into the chamber and attached to the wedge element such that extension of the piston rod from the cylinder means causes the clamp arm to move from its retracted position to its extended position until the fulcrum portion contacts the fulcrum stopper and further extension of the piston rod moves the wedge element with respect to the sloping wedge surface thereby causing the clamp arm to pivot about the fulcrum portion, and retraction of the piston rod into the cylinder means causes the clamp arm to move from its extended position to its retracted position by engagement of the jaw portion of the wedge element with the retracting hook means on the clamp arm.

4,504,047

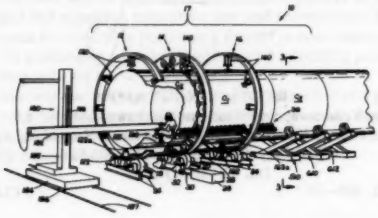
SCISSOR SUPPORT FOR WELDING TANK SECTIONS

Steven L. Jantzen, St. Charles, Mo., assignor to ACF Industries, Inc., New York, Nebr.W YORK

Continuation of Ser. No. 198,751, Oct. 20, 1980, abandoned. This application May 14, 1982, Ser. No. 378,316

Int. Cl.³ B23Q *3/18*

U.S. Cl. 269—43 **21 Claims**



19. A support and lift assembly for connected tank sections comprising: a scissors support and lift assembly located outboard of a tank cage; said support and lift assembly further including a pair of transversely extending arms; a first piston pivotably connected to one of said arms which extends generally horizontally into a first horizontally extending cylinder pivotably connected to the other arm; tank support means rotatably mounted at the end portion of each arm to support connected tank sections; a second piston extending generally vertically between a base and one of the arms and extending into a second cylinder connected to the other of said base and arms; vertical height limit switch means in said cage for controlling the height of said tank sections; means for applying fluid pressure to said first horizontal cylinder controlled by said limit switch means whereby said piston is displaced and said arms and respective support means are moved vertically to raise a tank section into connecting position.

4,504,048

MICRO-ADJUSTABLE DISPLACEMENT AND ROTATION SETTING APPARATUS

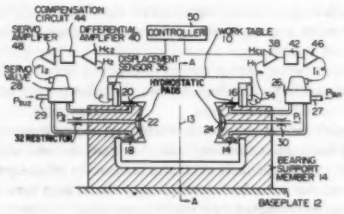
Kazuo Shiba; Masao Takahashi, both of Tokorozawa; Akira Kanai, Higashiyamato, and Kouichi Koizumi, Matsudo, all of Japan, assignors to Citizen Watch Company Limited, Tokyo, Japan

Filed Nov. 12, 1982, Ser. No. 441,131

Claims priority, application Japan, Nov. 13, 1981, 56-181863; Mar. 26, 1982, 57-48627; Mar. 26, 1982, 57-48628

Int. Cl.³ B23Q *1/04*

U.S. Cl. 269—71 **2 Claims**



1. A micro-adjustable displacement and rotation setting apparatus for rotating a controlled member about at least one axis of rotation by freely controllable amounts of angular displacement and linearly moving said controlled member in at least one predetermined direction of linear movement by freely controllable amounts of linear displacement, comprising:

a bearing support member for movably supporting said controlled member by a plurality of pairs of hydrostatic pads, the hydrostatic pads in each of said pairs being positioned to apply mutually opposing forces to said controlled member, each hydrostatic pad being disposed opposite and adjacent to a surface of said controlled member, each of said hydrostatic pads being coupled to valve means supplying a flow of operating fluid under pressure, said pairs of hydrostatic pads comprising at least a first and a second pair of hydrostatic pads for rotating and linearly displacing said controlled member, said first and second pairs being respectively disposed in symmetrically opposite orientations with respect to said axis of rotation, with each of said first and second pair of hydrostatic pads comprising at least one hydrostatic pad applying force to said controlled member tending to cause rotation of said controlled member in one direction about said axis of rotation and a second hydrostatic pad applying force to said controlled member tending to cause rotation of said controlled member in the opposite direction about said axis of rotation, a third pair of hydrostatic pads for restraining said controlled member against movement in a direction perpendicular to said axis of rotation, disposed to apply mutually opposing forces to said controlled member in a direction substantially perpendicular to said axis of rotation, and a fourth pair of hydrostatic pads for restraining said controlled member against movement in a direction parallel to said axis of rotation, disposed to apply mutually opposing forces to said controlled member in a direction substantially parallel to said axis of rotation;

first displacement sensing means disposed at a first side of said controlled member for sensing movement of said first side of the controlled member along said direction of linear displacement as measured at a position of said first displacement sensing means and generating a first displacement signal indicative thereof, and second displacement sensing means disposed at a second side of said controlled member in a position symmetrically opposite to that of said first displacement sensing means with respect to said axis of rotation, for sensing movement of said second side of the controlled member along said direction of linear displacement as measured at a position of said second displacement sensing means and generating a second displacement signal indicative thereof;

a controller operable to generate command signals designating a desired amount and direction of rotation or linear displacement of said controlled member, said command signals comprising a first command signal designating an amount and direction of linear displacement of said first side of the controlled member and a second command signal designating an amount and direction of linear displacement of said second side of the controlled member;

first differential amplifier circuit means for comparing said first command signal with said first displacement signal to thereby generate a first error signal indicative of a difference therebetween and first servo amplifier circuit means for amplifying said first error signal to produce a first drive signal, and second differential amplifier circuit means for comparing said second command signal with said second displacement signal to thereby generate a second error signal indicative of a difference therebetween and second servo amplifier circuit means for amplifying said second error signal to produce a second drive signal;

first servo valve means responsive to said first drive signal for controlling relative pressures of flows of said operating fluid supplied respectively to the hydrostatic pads of said first pair of hydrostatic pads to thereby produce said desired amount and direction of displacement of said first side of the controlled member, and second servo valve means responsive to said second drive signal for controlling relative pressures of flows of said operating fluid supplied respectively to the hydrostatic pads of said second pair of hydrostatic pads to thereby produce said

desired amount and direction of displacement of said second side of the controlled member; and

restrictor valve means for supplying flows of said operating fluid at specified fixed pressures to said third and fourth pair of hydrostatic pads.

4,504,049

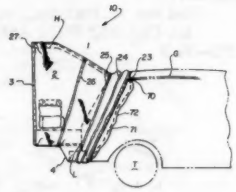
MOTOR VEHICLE CAMPING DEVICE

Robert P. Straub, 2802 Lawina Rd., Baltimore, Md. 21216

Filed May 25, 1983, Ser. No. 497,844

Int. Cl.³ B60P *3/34*

U.S. Cl. 296—165 **20 Claims**



1. A camping device adapted to enshroud a trailing portion of a vehicle having a rear bed area and an openable panel on a rear face thereof, the panel pivoting about a hinge on a roof of the vehicle transverse to the longitudinal axis of the vehicle comprising in combination:

means for extending the length of bed area of the vehicle beyond its associated rear bumper,

membrane means overlying said extension means engaging a lower rear portion of the vehicle and an upper rear portion of the vehicle forward the hinge,

wherein said membrane means includes a top panel, a pair of side panels depending from longitudinal edges of said top panel, a bottom panel interconnecting lowermost portions of said side panels, and a back panel sealing said top, side and bottom panels to form a bag like structure,

tensioning means operatively associated with said membrane means to affix same to the vehicle,

wherein said tensioning means includes a plurality of elastic membranes around the periphery of said membrane means whereby said membrane means can snugly engage vehicles of disparate proportions, and

sealing means along marginal portions of said membrane means to exclude adverse weather therebeyond,

including reinforcing means operatively associated with said sealing means to retard the sealing means tendency to curl up.

4,504,050

HEAD SUPPORT

Dennis R. S. Osborne, Chapel Hill, N.C., assignor to Duke University, Durham, N.C.

Filed Sep. 30, 1982, Ser. No. 428,969

Int. Cl.³ A61G *13/00*

U.S. Cl. 269—328 **9 Claims**

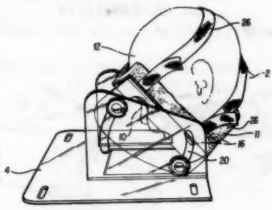
1. A head support for examination of a subject who is oriented in a prone position on a platform, comprising:

a base positioned on said platform;

at least one flange extending from said base;

a faceplate connected to said flange defining a support for cooperating with the face of said subject such that a forehead portion of said subject is supported at a first end portion of said faceplate and a chin portion of said subject is supported at a second end portion of said faceplate while said subject is in said prone position; and

means for rotatably adjusting said faceplate with respect to each said flange and for controlling the degree of extension of said subject which is necessary for performing said examination of said subject wherein said at least one said flange further comprises a first and second flange located on opposing sides of said faceplate, said first and second flange each has a first and second arcuate slot formed therein and wherein said means for rotatably adjusting said faceplate with respect to each said flange further



comprises adjustable securing means disposed within each said first and second arcuate slot for selectively interconnecting and positioning said faceplate with respect to said first and second flanges.

4,504,051

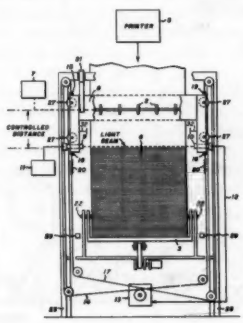
CONTINUOUS FORMS REFOLDER FOR HIGH SPEED PRINTERS

John R. Bittner; Harry R. Berrey, and Ralph S. Billings, all of Waynesboro, Va., assignors to Genicom Corporation, Waynesboro, Va.

Filed Apr. 12, 1979, Ser. No. 29,390

Int. Cl.³ B41L *1/30*

U.S. Cl. 270—40 **7 Claims**



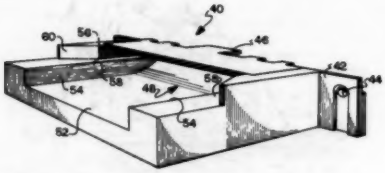
1. An arrangement for refolding and stacking fanfold paper emerging from a printer, said paper having transversely extending folds which are longitudinally spaced with alternate folds pointing in opposite directions and wherein at least one fold of said paper is properly oriented on a platform on which subsequent folds are to be stacked comprising a first station for receiving said paper from said printer and for driving said received web longitudinally toward said platform for refolding and—stacking in the region between said first station and said platform, said first station located a given distance above said platform and centered between alternate folds of the paper stacked on said platform, means for indicating when the top of the stacked paper on said platform has reached a predetermined distance from said first station to produce a control signal, and means responsive to said control signal for moving said first station to increase the distance between said first station and said top of said stack by a predetermined amount for additional stacking.

4,504,052

NOTE RECEPTACLE FOR CURRENCY VALIDATOR

Sanford C. Murck, Gates Mills, and Anthony H. Dolejs, Bedford Heights, both of Ohio, assignors to Ardac, Inc., Eastlake, Ohio

Filed Jun. 16, 1982, Ser. No. 389,029
Int. Cl.³ B65H 3/44
U.S. Cl. 271—9 10 Claims



1. A note receptacle for a currency validator, comprising:

top and bottom plates having first end portions in spaced-apart, parallel relationship with each other, and defining a passageway therebetween; and

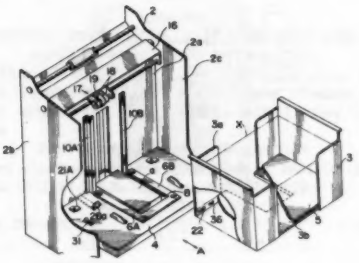
side rails connected to said top and bottom plates along lateral edges thereof, said side rails defining plural widths of said passageway at second end portions of said top and bottom plates.

4,504,053

PAPER FEEDING MEANS FOR RECORDING APPARATUS

Takao Shiozawa, Hachioji, Japan, assignor to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Jan. 28, 1982, Ser. No. 343,514
Claims priority, application Japan, Feb. 19, 1981, 56-23502; Apr. 25, 1981, 56-63159
Int. Cl.³ B65H 3/04
U.S. Cl. 271—34 3 Claims



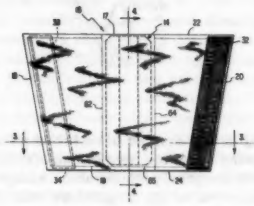
1. In an electrophotographic copying apparatus, the improvement consisting of a supplemental paper feeding device for supplying sheets of recording paper, one by one to the copying apparatus, said device including a receiving table having vertically extending front and side walls, a lift having a platform and means raising and lowering said platform between said table and a position near the top of said walls, an open top container having side walls and a base having an opening therein substantially corresponding to the dimensions of said lift platform, a pallet positioned within said container for receiving stacked sheets of recording paper, means for positioning said container on said table within said vertically extending walls so that the opening in its base corresponds to the top of said platform, means for detachably holding said container on said receiving table including locking means for locking said container to said receiving table when said lift is in other than its lowermost position, whereby the raising or lowering of said lift raises and lowers said pallet and the papers supported thereon, feeding means positioned between the vertical side walls extending from said table for feeding papers from said device when said pallet and the papers supported thereon are raising into contact with said feeding means, and means in said copying apparatus for receiving the papers so fed.

4,504,054

ELBOW BRACE FOR BOWLERS AND GOLFERS

Emanuel L. Jackson, 64 Bryant St. NW., Washington, D.C. 20001, and Berlin F. Myers, 3709 Halloway N., Upper Marlboro, Md. 20772

Filed Sep. 16, 1981, Ser. No. 302,741
Int. Cl.³ A63B 69/36; A63D 5/00
U.S. Cl. 273—54 B 11 Claims



1. An elbow restraint device comprising: a

pliable member having a first edge, a second edge, a third edge, a fourth edge, an interior layer and an exterior layer, and which is adapted to be wrapped around the user's arm over the elbow, and which includes an elongated casing having one end which is open, said casing being substantially mid-way between said first edge and said third edge and transverse to the direction in which said member is wrapped in use;

a rigid elongated plate member removably housed within said casing and adapted to fit through said open end and against the back of the arm over the elbow during use, and run longitudinally along the arm, whereby the arm is held in a substantially fully extended position;

a layer of padding attached to one side of said rigid member; and

means for fastening said device around the arm, whereby said first edge and said third edge overlap each other when said device is fastened around the arm.

4,504,055

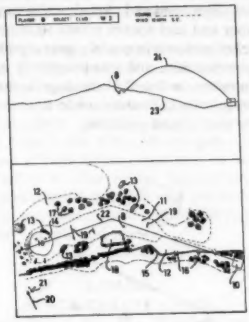
ELECTRONIC VIDEO GAME APPARATUS ADAPTED FOR USE TO PLAY A SIMULATED GAME OF GOLF

Charles D. Wells, "Glaed Hame", Pasture Rd., Letchworth, Hertfordshire, England

Filed Jan. 10, 1983, Ser. No. 456,728
Claims priority, application United Kingdom, Jan. 13, 1982, 8200917
Int. Cl.³ A63B 69/36
U.S. Cl. 273—85 G 18 Claims

1. An electronic video game apparatus adapted for use to play a simulated game of golf, comprising video display means programmed to visually present a display of the game of golf, showing features of a golf course and showing successive positions of an imaginary golf ball on the course during the game, the apparatus being variably programmable by first means to simulate different weather conditions and/or different course conditions, the apparatus also comprising second means selectively operable by a player to simulate choices of imaginary golf club and of strengths and directions of imaginary slots, the apparatus being adapted to plot said successive positions of the golf ball in dependence upon the particular

weather conditions and/or course conditions being simulated and in dependence upon the particular choices of imaginary



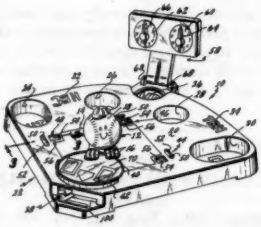
golf club and of strengths and directions of imaginary shots, as well as in dependence upon said features of the golf course.

4,504,056

TOY HAVING PLAYING SURFACE WITH ROTATING MEMBER LOCATED THEREON

Hideyuki Kanno, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan

Filed Oct. 6, 1982, Ser. No. 433,030
Claims priority, application Japan, Oct. 13, 1981, 56-151884
Int. Cl.³ A63F *7/06, 7/38*
U.S. Cl. 273—88 **8 Claims**



1. In combination with a self-propelled object a toy which comprises:

a housing having a playing surface, said playing surface including a circular depression formed in said playing surface;

a member sized and shaped to fit within said circular depression, said member rotatably mounted on said housing within said circular depression, said member including a member surface, said member surface being aligned with said playing surface and rotatable with respect to said playing surface as said member rotates;

means located on said housing to rotate said member such that said object can move over said playing surface toward and on to said member surface followed by rotation of said member with respect to said playing surface while said object is located on said member surface prior to movement of said object off of said member surface back on to said playing surface;

retaining means positioned on said playing surface in association with said circular depression, said retaining means extending around a portion of the periphery of said circular depression, said retaining means capable of inhibiting movement of said object;

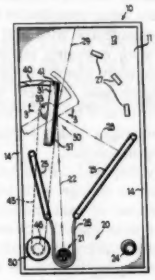
scoring means located on said playing surface, at least a portion of said scoring means comprising a scoring depression formed in said playing surface, said scoring depression sized and shaped to hold said object and being capable of retaining said object if said object moves from said playing surface into said scoring depression.

4,504,057

PINBALL GAME AND ROTATABLE BUMPER THEREFOR

Max Wiczer, Skokie, Ill., assignor to Wico Corporation, Niles, Ill.

Filed Dec. 23, 1982, Ser. No. 452,711
Int. Cl.³ A63F *7/02, 7/36*
U.S. Cl. 273—119 R **3 Claims**



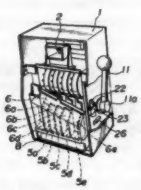
1. In a pinball game including a playfield board with one or more targests thereon, the improvement comprising: means for propelling a pinball into rolling engagement with the playfield board along a single predetermined path, a passive rebound device disposed on said playfield board along the path, means movably mounting said rebound device on the playfield board for movement among a plurality of stationary rebound positions, said rebound device in each of said rebound positions being passively disposed for engagement by a pinball propelled along said path for deflecting the pinball in a direction corresponding to the rebound positon without accelerating the pinball, and positioning means coupled to said mounting means and operable when the pinball is at rest for selectively positioning said rebound device in a selected one of said rebound positions to determine the direction in which the pinball will be deflected during the next propulsion thereof, thereby to vary the direction in which a pinball rebounds from said rebound device.

4,504,058

SLOT MACHINE

Yoshie Itoh, Tokyo, Japan, assignor to Wagner Shokai, Inc., Tokyo, Japan

Filed Jan. 27, 1983, Ser. No. 461,457
Claims priority, application Japan, May 2, 1982, 57-016391
Int. Cl.³ A63F *5/04*
U.S. Cl. 273—143 R **3 Claims**



1. A slot machine comprising:

a frame,

a plurality of drums rotatably mounted on a drum shaft horizontally disposed within said frame, each of said

drums being provided on its periphery with pictures, symbols, etc.,

each of said drums being provided on its one side with a notched disc having shallow notches and deep notches,

a supporting shaft disposed at a suitable distance from said drum shaft,

a kicker rotatably mounted on said supporting shaft, said kicker having projections for kicking said notched discs, said kicker being usually given a tendency to turn in the direction of disengaging from said notched discs,

movable frames corresponding to said drums, said movable frames being rotatably mounted on said supporting shaft, said movable frames being provided at one end with stoppers respectively engageable with said notched discs and at the other end with engaging portions, said movable frames being respectively given a tendency to turn in the direction of engaging said stoppers with said notched discs, said movable frames having connecting means between them, said movable frames being provided at their lower end with driving means,

a cam plate rotatably disposed within said frame, said cam plate being adapted to engage with and disengage from said engaging portions of said movable frames by the turning of said cam plate, one edge of said cam plate being stepped so as to permit the engagements between said cam plate and said engaging portions to be released in regular sequence and at intervals according to the angle of said cam plate, said cam plate being usually controlled so as to be out of engagement with said engaging portions,

an actuating lever attached to one end of said supporting shaft, said actuating lever turning said kicker against said tendency thereof so as to engage its projections with said notched discs, said actuating lever turning said movable frames against said tendency thereof and through said connecting means, said actuating lever further turning said cam plate against said control so that said cam plate engages with said engaging portions of said movable frames when said movable frames have been turned to a certain degree,

a plurality of coin cases, the outlets of which are usually closed by means of coin shutters,

coin stoppers corresponding to said coin shutters, said coin stoppers being driven by the driving means of said movable frames so as to open said coin shutters,

a mechanical timer disposed on the side opposite to said actuating lever, said mechanical timer being adapted to turn said cam plate, engaged with said engaging portions of said movable frames, at a certain speed in the direction of disengagement therefrom,

said drums, rotated by said projections of said kicker, being stopped by said stoppers of said movable frames in regular sequence and at invervals as said cam plate is rotated by means of said timer permitting stepwise disengagement of said engaging portions of said movable frames, said stopper or stoppers entering said deep notch or notches and one or some or all of said coin cases being opened when one or more predetermined pictures, symbols, etc. or a predetermined combination thereof is obtained.

4,504,059

SUPPORT APPARATUS FOR VIDEO GAME JOYSTICK CONTROL UNIT

Steven W. Weinrieb, 8717 Cold Spring Rd., Potomac, Md. 20854

Filed Sep. 30, 1982, Ser. No. 430,236
Int. Cl.³ A63B *71/04*
U.S. Cl. 273—148 B **7 Claims**

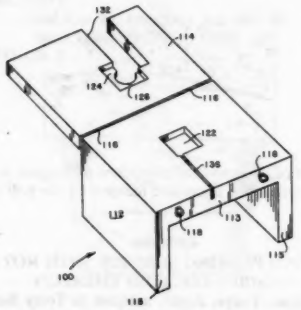
1. Support apparatus for a joystick control unit, comprising:

a base member;

a cover member;

socket means defined between said base member and said cover member for housing the joystick control unit within said apparatus, said socket means being sized so as to accommodate the joystick control unit to substantially preclude movement thereof in any direction;

said cover member being pivotably secured to said base member between open and closed positions relative to said base member and said socket means so as to permit access to said socket means when said cover member is disposed in said open position, and to operatively cooperate with said base member in fixedly retaining the joystick control unit within said socket means when said cover member is disposed in said closed position;



aperture means defined within said cover member for permitting the joystick of the joystick control unit to project outwardly of said support apparatus when said cover member is disposed in said closed position whereby access to the joystick is provided from a position external of said apparatus; and

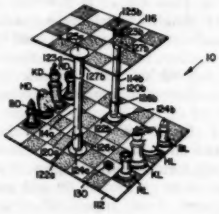
fastening means disposed externally upon said apparatus for securing said pivotably cover member in said closed position relative to said base member, and for releasing said pivotable cover member relative to said base member so as to enable said cover member to be moved to said open position.

4,504,060

CHESS-LIKE GAME WITH TWO VERTICALLY SPACED BOARDS

Clayton Riihiluoma, 3923 Foss Rd., No. 101, Minneapolis, Minn. 55421, and Kurt R. Miller, 4902 London Rd., Duluth, Minn. 55804

Filed Aug. 19, 1982, Ser. No. 409,360
Int. Cl.³ A63F *3/00, 3/02*
U.S. Cl. 273—241 **16 Claims**



7. A board game apparatus, comprising:

(a) at most two vertically separated game boards, a first game board defining a generally horizontal playing surface, said first game board defining less than sixty-four playing positions arranged in generally perpendicular rank and file rows, said first game board including means for vertically supporting a second game board above said first game board, said second game board defining a gen-

erally horizontal playing surface, said second game board defining less than sixty-four playing positions arranged in perpendicular rank and file rows, said second game board defining a different number of playing positions than said first game board;

(b) two sets of playing pieces, each of said sets of playing pieces being distinguishable from the other set of playing pieces and having less than a conventional number of chess pieces, each of said sets of playing pieces including four playing pieces corresponding to the king, knight, bishop and rook in the conventional game of chess; and,

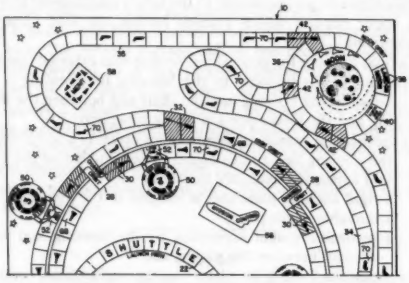
(c) at least one of said playing positions on said first game board including an obstruction thereon preventing said playing pieces from occupying said position, the remaining positions providing playing positions capable of being occupied by said playing pieces.

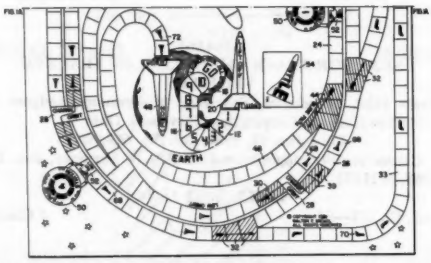
4,504,061

SPACE TRAVEL GAME

Walter F. Michel, Rte. 1, Box 12A, Westover, Md. 21871

Filed Dec. 20, 1982, Ser. No. 451,731
Int. Cl.³ A63F *3/00*
U.S. Cl. 273—250 **11 Claims**





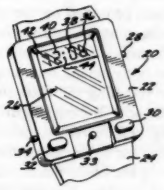
1. Game apparatus comprising a plurality of position markers, a gameboard having thereon a representation of the earth and its moon, a plurality of concentric orbits around the earth including a low earth orbit and a high earth orbit, whereby said low earth orbit and said high earth orbit do not intersect one another, an orbit around the moon, at least one path connecting the high earth orbit and the moon orbit, at least one sub-orbital path extending between the earth and the low earth orbit, each of said orbits and said paths comprising a plurality of serially arranged positions, at least one change orbit space connecting the low earth orbit and the high earth orbit, said change orbit space comprising a position on said high orbit and a position on said low orbit, whereby a position marker changes from one to another of said orbits by landing on said change orbit space, at least one auxiliary change orbit space associated with each change orbit space, whereby a position marker is enabled to change from one to another orbit by landing on said auxiliary change orbit space and whereby each of said change orbit spaces and the respectively associated at least one auxiliary change orbit space are serially arranged in an unvarying change orbit path such that a marker moving from one orbit to another traverses said change orbit path, at least one orbit escape space in each of the high earth orbit and the moon orbit for providing access to the connecting paths, and chance means for directing the movement of the position markers along said paths and orbits by a variable number of positions.

4,504,062

DIGITAL WATCH HAVING MATRIX DISPLAY FOR ARCADE-LIKE GAME PLAYING

Jay Smith, III, Pacific Palisades, and Gerald S. Karr, Venice, both of Calif., assignors to Smith Engineering, Culver City, Calif.

Filed Jun. 4, 1981, Ser. No. 270,314
Int. Cl.³ A63F *9/00*
U.S. Cl. 273—313 **1 Claim**



1. A wristwatch having a game face, comprising:

a matrix display on the face, having a plurality of display elements for indicating the status of the game at any given time by illumination of the display elements;

means for player control of the position on the matrix display of at least one player controlled display element during the course of the play of a game;

means for sequentially illuminating selective display elements at adjacent matrix locations to visually impart stepwise movement of game display elements about the matrix in response to a programmed set of instructions stored in memory;

means for sequentially illuminating selective display elements to visually impart stepwise movement of game display elements about the matrix in response to player control input and a programmed set of instructions stored in a memory;

means for changing the state of illumination of selected game display elements in response to coincidence on the matrix of at least one player controlled display element and one of the game controlled display elements;

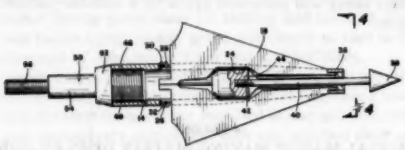
means for changing the state of illumination of selected game display elements in response to coincidence on the matrix of two game controlled display elements;

the matrix display having the plurality of display elements arranged in rows and columns with each display element having at least two separately displayed segments, an inner arcuate segment and an outer arcuate segment, said inner and outer segments lying substantially on a circle;

the display elements of at least one of the plurality of rows or at least one of the plurality of columns comprising three separately displayed segments, including an inner dot segment, a second upper arcuate outer segment and a second lower arcuate outer segment, said second upper and second lower segments lying substantially on a circle about said dot segment; and

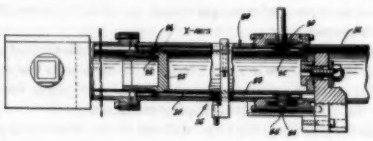
means for sound generation in conjunction with the occurrence of selected game play events.

4,504,063
HUNTING BROADHEAD ARROW
Charles F. LeBus, P.O. Box 2352, Longview, Tex. 75606
Filed Jun. 22, 1984, Ser. No. 623,339
Int. Cl.[3] F41B *5/02*
U.S. Cl. 273—422 7 Claims



1. A hunting broad arrow comprising hollow body means, a plurality of circumferentially spaced longitudinally extending slots provided in the body means and extending through the sidewall thereof, normally retracted independent blade means disposed in each slot and having one edge open to the interior of the hollow body means, shaft means slidably disposed in the hollow body and having one end extending axially outwardly therefrom, point means provided on the outwardly extending end of the shaft means, plunger means provided on the opposite end of the shaft means and slidably disposed within the interior of the hollow body means, retaining means disposed on the hollow body for retaining the blade means in the normal retracted position thereof during flight of the arrow, the plunger means being responsive to movement of the point means in one direction for overcoming the force of the yieldable means for moving the blade means radially outwardly to provide an increased cutting diameter for the arrow upon impact thereof with an object.

4,504,064
LASER PATH SEAL
Salvatore Romano, Trumbull, Conn., assignor to Moore Special Tool Co., Inc., Bridgeport, Conn.
Filed Sep. 7, 1982, Ser. No. 414,980
Int. Cl.[3] F16K *41/00*
U.S. Cl. 277—12 8 Claims



1. A rolling diaphragm seal to preclude introduction of foreign material between a pair of telescoping tubes comprising:

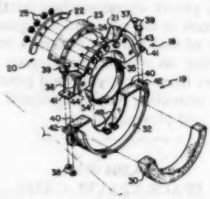
a flexible tube folded back upon itself at opposite ends to form a chamber between spaced portions thereof to receive pneumatic fluid therein between the spaced ends of said tube,

said flexible tube being located between the outer surface of said inner and the inner surface of said outer, telescoping tubes,

the spaced ends of said flexible tube being fixed to the outer one of said telescoping tubes, and

a portion of said flexible tube spaced from said spaced ends thereof being fixed to said inner tube.

4,504,065
UNIVERSAL STERN TUBE AND PROPELLER SHAFT SEALING APPARATUS
Thomas H. Devine, 147 Jefferson Ave., Chula Vista, Calif. 92102
Filed Jan. 6, 1984, Ser. No. 568,573
Int. Cl.[3] F16J *15/10*
U.S. Cl. 277—12 25 Claims



1. An apparatus for sealing the external opening between a propeller shaft and a stern tube on a ship on which the stern tube has a lower portion which terminates in an aft face that is approximately perpendicular to the tube's longitudinal axis and an upper portion which extends further aft; said apparatus comprising

a rigid housing for generally covering said external opening;

closure means coupled to the housing for creating a seal between the housing and the shaft and between the housing and the lower portion of the tube; and

a mechanical expansion assembly for creating a seal between the housing and the extended upper portion of the tube, said expansion assembly including

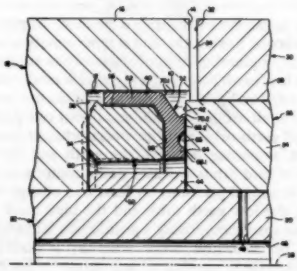
a rigid backing plate that is integral to the housing;

a movable crush plate;

a malleable gasket supported by the housing and sandwiched between the plates; and

means for forcing the plates together to force the gasket to expand outward from the housing to create a seal against the inner surface of the tube's extended upper portion.

4,504,066
SEAL FOR TRACK CHAIN LINK OF TRACKED VEHICLES
Ernst Hörl, Freudental, Fed. Rep. of Germany, assignor to Parker-Hannifin Corporation, Cleveland, Ohio
Filed Jun. 11, 1984, Ser. No. 619,095
Claims priority, application Fed. Rep. of Germany, Jun. 11, 1983, 3321152
Int. Cl.[3] F16J *15/34*
U.S. Cl. 277—84 4 Claims



1. Seal for track chain links on tracked vehicles, in which four chain sprockets, arranged side-by-side in pairs and overlapping in pairs, as well as a chain socket solidly joining the

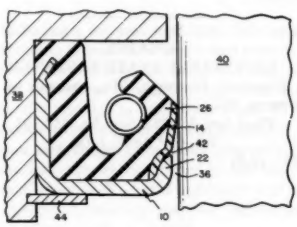
ends of the sprockets lying axially within the overlapping zone, and a coaxial chain bolt solidly joining the chain members lying axially outside in the overlapping zone form a chain link which can be lubricated, from a bore in the bolt which can be filled with lubricant, through a radial bore in the bolt, while each sprocket lying axially outside, in the overlapping zone, has on its inner side a round cylindrical depression, to receive the seal, and a rigid distancing ring, sitting on the end of the bolt extending out of the socket, while the bottom surface of the depression, lying in one radial plane, lies opposite a sprocket next to the end surface of the dpression, lying in a parallel plane, and in which two overlapping sprockets form a ring gap, which opens the hollow space limited by the depression and the end surface lying axially opposite same; the seal, consisting of a softer solid ring, statically sealing against a boundary surface of the depression, and of a harder, more wear-resistant flange ring, which lies against the ring-form coaxial boundary surface of the depression, and dynamically seals against the end surface axially opposite the depression, with stress on the link, the flange ring supporting the solid ring both axially and radially, and between each of these rings, on the one hand, and the distancing ring, on the other hand, a distance is present, with the distinction that the solid ring is clamped axially between the bottom surface of the depression and a flange ring, lying against the sprocket end surface lying opposite the bottom surface, which lies broadly, by an end surface, divided by a ring groove running around the bolt, against the end surface of the sprocket, and that the solid ring is supported radially on the outside, by means of a flange ring, lying against the ring-form boundary surface of the depression, while the flange ring has a substantially L-shaped profile and a slight distance from the bottom surface of the depression, and occupies a pressure seating in the cylindrical boundary surface of the depression.

4,504,067

HIGH PRESSURE SHAFT SEAL WITH LOW-FRICTION LIP LINER

Douglas A. Cather, Jr., Gastonia, N.C., assignor to Garlock Inc., Longview, Tex.

Filed May 30, 1984, Ser. No. 615,159
Int. Cl.³ F16J *15/34*
U.S. Cl. 277—153 **16 Claims**



1. A lip type seal comprising

(a) an annular generally U-shaped metal shell having a pair of generally cylindrical portions and a generally radial portion extending between ends of said cylindrical portions,

(b) an elastomeric body bonded to said generally radial portion of said shell and

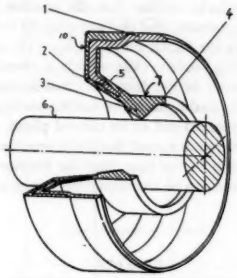
(c) a low-friction lip liner bonded to a sealing portion of said elastomeric body at all points of contact therebetween and extending axially at least from a sealing lip, thence between said elastomeric body and one of said generally cylindrical shell portions and to a point adjacent to said radial portion of said shell, said low-friction liner being bonded only to said elastomeric body.

4,504,068

SHAFT SEALING RING

Helmut Hölzer, Weinhem, Fed. Rep. of Germany, assignor to Firma Carl Freudenberg, Weinheim an der Bergstrasse, Fed. Rep. of Germany

Filed Jun. 30, 1980, Ser. No. 163,962
Claims priority, application Fed. Rep. of Germany, Aug. 25, 1979, 2934487
Int. Cl.³ F16J *15/32*
U.S. Cl. 277—164 **9 Claims**



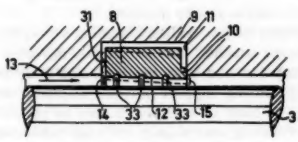
1. In a shaft sealing ring including a stiffening ring having an angular profile, a lip ring with a sealing lip, means in the nature of a diaphragm attached to and connecting said lip ring to said stiffening ring and an elastic contact pressure means arranged to press the sealing lip resiliently against the surface of the sealed shaft, the improvement comprising the contact pressure means being an extension from the stiffening ring protruding 40 to 80% into the cross section of said means in the nature of a diaphragm.

4,504,069

SEALING DEVICE BETWEEN MOVABLE PARTS

Stig Stenlund, Saltsjöbaden, Sweden, assignor to Hep Products AB, Alvsjo, Sweden

PCT No. PCT/SE83/00157, § 371 Date Dec. 22, 1983, § 102(e) Date Dec. 22, 1983, PCT Pub. No. WO83/03881, PCT Pub. Date Nov. 10, 1983
PCT Filed Apr. 22, 1983, Ser. No. 573,930
Claims priority, application Sweden, Apr. 23, 1982, 8202564
Int. Cl.³ F16J *15/38*; F16K *41/00*
U.S. Cl. 277—174 **8 Claims**



1. A sealing device for sealing in one direction between the co-operating surface of a cylindric cavity and the shell surface of a spindle movable therein, of which surfaces either is provided with an annular groove, in which a sealing ring is located, which has some mobility in axial and radial direction, and which is intended to minimize the fluidum leakage in axial direction between the co-operating surfaces, and the sealing surface of the ring positioned in a groove in the cylindric cavity is located about the inner surface of the ring, and of the ring positioned in a groove in the spindle is located about the outer surface of the ring, characterized in that the ring (8) has small cross-sectional dimensions in relation to the spindle (3) and enclosing cavity (2), that the ring is so slim that dimensioning fluidum pressure over the ring easily is capable to change

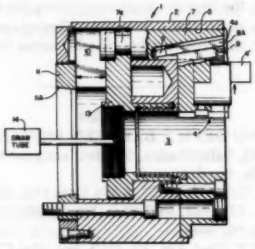
the diameter of the ring (compression or expansion), but is of such a rigid material that deformation of the cross-section of the ring is negligible relative to the change in diameter of the ring, that the sealing surface (12) of the ring is slightly conic and provided with at least one overall groove (33), that the ring is located so that the sealing surface (12) at co-operation with the sealing surface of either the cavity (2) or spindle (3) forms a gap (14,15), the height (>0) of which decreases in the direction to that side of the ring against which sealing is to take place, i.e. in the flow direction of the leakage, that co-operating sealing surfaces have such a fine surface profile that the total of their profile depths is smaller than the smallest dimension of said gap at high pressure, and that the ring (8) on said lastmentioned side abuts the radial inner surface (11) of the groove along a supporting surface (10), which is annular and has a substantially smaller height than the cross-sectional height of the ring and is located against the sealing surface (12) so that the ring can be twisted out of its central plane, and said supporting surface has such a small height dimension in relation to the axial dimension of the ring, that the friction force in the supporting surface can be overcome by forces acting radially on the ring.

4,504,070

ANTI-CENTRIFUGAL CHUCK

Gerald W. Norton, Schoolcraft, Mich., assignor to Speedgrip Chuck, Inc., Elkhart, Ind.

Filed Jun. 9, 1982, Ser. No. 386,685
Int. Cl.³ B23B *31/16*
U.S. Cl. 279—1 C **10 Claims**



1. An anti-centrifugal chuck for exteriorly gripping workpieces while rotating at high speeds, comprising:

(a) a single, unitary body member;

(b) a plurality of jaw bodies, including workpiece gripping jaw means attached thereto, radially-movably supported and guided at said body member, said body member including backing support portions disposed radially outwardly of each of said jaw bodies to provide backing forces resisting centrifugally induced radial outward jaw body movements during high speed rotation of the chuck;

(c) a plurality of wedge members, each of which is received within a respective, complementarily-shaped, bore serving as a wedge member guideway in said body member, said wedge member being operatively connectd to a respective one of said jaws; and

(d) actuator means, connected to said plurality of wedge members, for displacing same in unison between an axially rearwardly-retracted position wherein said jaws are withdrawn radially outwardly and axially forwardly displaced positions wherein said jaws are compressively displaced radially inwardly for gripping of a workpiece,

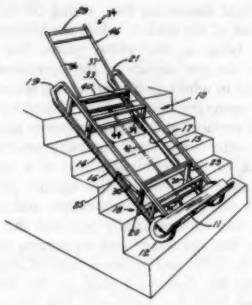
wherein said wedge member guide ways are of sufficient axial extent to fully support the respective wedge members when in their axially forward positions.

4,504,071

TWO WHEELED UTILITY CART

Richard S. Drummond, 1504 SW. 1st St., Rochester, Minn. 55901

Filed Sep. 27, 1982, Ser. No. 423,791
Int. Cl.³ B62B *5/02*
U.S. Cl. 280—5.24 **11 Claims**



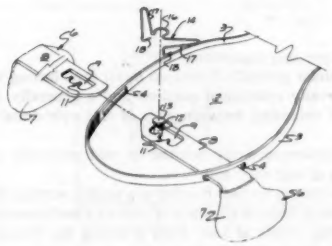
1. In a wheeled hand truck of the type having an elongated frame with a load engaging lip and a set of wheels near one end thereof and user grippable handles near the other end thereof, the improvement comprising a stairstep engaging leg pivotably mounted on the frame intermediate the one and other ends selectively movable between a stowed position and an extended position for selectively engaging a step and precluding sliding movement in the direction of elongation down a flight of steps, an auxiliary handle selectively movable between a retracted position for conventional truck use and an operative position extending obliquely from the frame other end to provide a user with a more readily accessible gripping region when moving the truck along a flight of steps, the auxiliary handle being slidable relative to the frame and including a curved portion near one end thereof, the frame including slot means in which the auxiliary handle may slide and means cooperating with the handle curved portion and the auxiliary handle approaches the operative position to induce rotation of the auxiliary handle in conjunction with the sliding movement thereof, and spring means biasing the handle toward the retracted position.

4,504,072

ADJUSTABLE SKATE FASTENER

Ronald R. Klawitter, Hermann, Mo., assignor to Handi-Pac, Inc., Hermann, Mo.

Filed Jan. 3, 1983, Ser. No. 455,103
Int. Cl.³ A63C *1/04*
U.S. Cl. 280—11.31 **4 Claims**



1. An improved adjustable shoe fastener assembly for roller skates and the like, comprising: a sole plate having downwardly extending flanges with elongated slots disposed therein

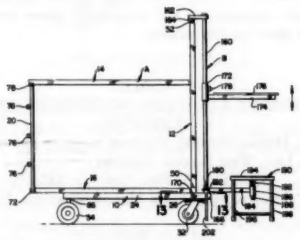
at opposite sides of said plate; a pair of opposed shoe fastener members mounted on said sole plate, each fastener member including an outer upwardly and forwardly inwardly angled shoe-engaging portion and an inboardly directed blade portion passing through one of the flange slots, each blade having an elongated slot disposed therein; detent means mounted on said sole plate to extend downwardly through each slot; racked tooth means cooperatively disposed adjacent said detent means in the forward part of each of said slots to permit preselected positioning and limited inward and outward movement of said blade portions and the shoe-engaging portions associated therewith; and spring biasing means cooperating with said blade portions to bias said blade portions rearwardly toward said detent means yieldably to retain said racked tooth means in preselected position with said detent means, said detent means comprising downwardly extending pin means, each elongated blade slot having a rack of teeth disposed therein along one side, said spring means yieldably urging said rack into engagement with said pin means in a preselected tooth position.

4,504,073

CART STRUCTURE FOR STOCKING MERCHANDISE

Harold Isaacs, 2567 Lafayette Dr., University Heights, Ohio 44118

Division of Ser. No. 784,148, Apr. 4, 1977, Pat. No. 4,263,986. This application Apr. 28, 1981, Ser. No. 258,056
Int. Cl.³ B62B *3/00*
U.S. Cl. 280—33.99 A **3 Claims**



2. A cart including a wheeled base frame having an upright end frame extending upwardly from one end thereof, an upper shelf having one end connected to said end frame by a hinged connection for movement between an operative position extending generally parallel to said base frame in upwardly spaced relationship thereto and a storage position extending upwardly from said hinged connection generally parallel to said end frame, and support legs carried by said upper shelf for supporting said upper shelf in said operative position on said base frame at support locations spaced a substantial distance from said end frame,

wherein said support legs are hingedly connected with said upper shelf for movement between a collapsed position extending generally parallel to said upper shelf in said storage position thereof and an extended position extending downwardly from said upper shelf in said operative position thereof;

and further including cooperating abutment means between said base frame and said support legs for preventing movement of said support legs about their hinged connection with said shelf when said shelf is in said operative position,

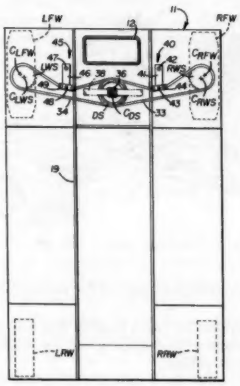
wherein said support legs have open free ends and said cooperating abutment means comprises projections upstanding from said base frame for reception in said open free ends of said support legs.

4,504,074

STEERING SYSTEM

Daniel G. Smith, Reedley, Calif., assignor to Upright, Inc., Berkeley, Calif.

Filed Jun. 8, 1983, Ser. No. 502,258
Int. Cl.³ B62D *3/02*
U.S. Cl. 280—93 **6 Claims**



1. A steering system for a wheeled vehicle having a generally horizontal frame, first and second wheels at one end of said frame and third and fourth wheels at the other end of said frame, said first and second wheels each being turnable about its own vertical axis, the steering system comprising:

first and second posts mounted on said frame for axial rotation,

means for turning said first wheel about its vertical axis in response to axial rotation of said first post,

means for turning said second wheel about its vertical axis in response to axial rotation of said second post,

a manually operable steering member movable in opposite directions,

a first wheel sprocket fixed on said first post for rotation therewith, the center of said first wheel sprocket being offset from the axis of said first post,

a second wheel sprocket fixed on said second post for rotation therewith, the center of said second wheel sprocket being offset from the axis of said second post,

a drive sprocket connected to said steering member for axial rotation of said drive sprocket in response to movement of said steering member,

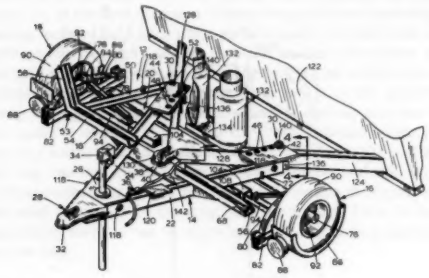
chain means trained around said first and second wheel sprockets and said drive sprocket for rotation of said first and second wheel sprockets in one direction from their neutral position in response to rotation of said drive sprocket in one direction from its neutral position, and for rotation of said first and second wheel sprockets in the opposite direction from their neutral positions in response to opposite rotation of said drive sprocket from its neutral position,

means for positively and unyieldingly maintaining said chain means taut around said wheel and drive sprockets during rotation of said sprockets in both directions of rotation thereof.

4,504,075
TOWABLE TRANSPORT CARRIER FOR MOTORCYCLES AND THE LIKE

Dennis E. Dawson, 2716 Fleur Dr., Apt. #1, Des Moines, Iowa 50321

Filed Jun. 22, 1983, Ser. No. 506,809
Int. Cl.³ B60P 3/06
U.S. Cl. 280—402 11 Claims



1. A towable transport carrier for motorcycles and the like, comprising:

a wheeled frame having a leading end and a trailing end,

coupling means on said leading end for hitchable connection to a towing vehicle,

a support member for a motorcycle or the like mounted on said frame,

means on said trailing end for selective removable attachment to another towable vehicle of a type provided with a hitch coupling means,

hitch means on said frame for coupling engagement with the hitch coupling means on said other towable vehicle,

said other towable vehicle being of a type provided with a tongue assembly for carrying the hitch coupling means,

said wheeled frame comprising a pair of secured beams spaced apart at said trailing end and adapted at said end to embrace the tongue assembly of said other towable vehicle,

respective rigid plate members on each beam at the trailing end and projecting laterally therefrom to overlap an embraced portion of said tongue assembly,

a respective rigid clamp member engageable with a respective portion of said tongue assembly, and

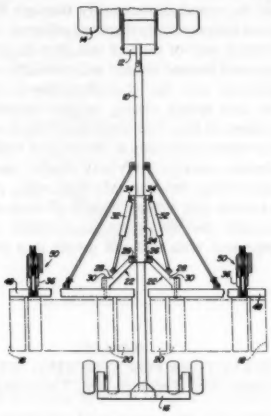
respective fastening means to removably secure said plate members at the overlapping portion to said clamp.

4,504,076
FORWARD-FOLDING AGRICULTURAL IMPLEMENT FEATURING NARROW ROW SPACING

Harris I. Bedney, Rock Island, Ill., assignor to Deere & Company, Moline, Ill.

Filed Sep. 16, 1983, Ser. No. 532,866
Int. Cl.³ B62D 21/14
U.S. Cl. 280—411 A 10 Claims

1. In an agricultural machine having a central fore-and-aft hitch supported at its rear end portion on a wheeled carriage and at its forward end portion on a tractor, right and left wing sections respectively at right and left sides of the hitch and ahead of the carriage, right and left pivotal connections respectively connecting the sections to the hitch for selective disposition of the wing sections in an operating mode in substantially end-to-end alignement transverse to the hitch and a transport mode folded forwardly alongside opposite sides of the hitch, each pivotal connection including a horizontal pivot for vertical flexing of its section and a vertical pivot for folding of its section, each section including a frame portion which is disposed forwardly in the operating mode of the section and which lies closely adjacent to the hitch in the transport mode of the hitch, and right and left wing-supporting wheels respectively for the sections, the improvement comprising a pair of wheel carriers, one for and journaling each wheel for rolling on the ground, and a pair of mounting means, one for each carrier, each means connecting its carrier to the respective

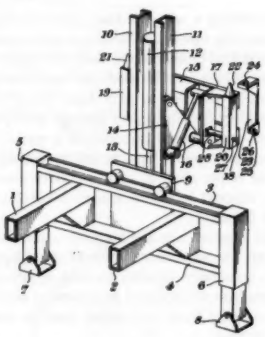


wing frame portion for selective movement between an extended position in which the associated wheel and carrier are ahead of the frame portion in the operating mode of the section and a retracted position rearwardly of the extended position and closely adjacent to the associated frame portion in the transport mode of the section.

4,504,077
IMPLEMENT ATTACHMENT DEVICES FOR LAND VEHICLES

Albert W. Hobbs, Slinfold, England, assignor to Century Fabrications Ltd., West Sussex, England

Filed Oct. 5, 1982, Ser. No. 432,850
Claims priority, application United Kingdom, Nov. 5, 1981, 8133351
Int. Cl.³ B60D 1/18
U.S. Cl. 280—490 R 8 Claims



1. A device for attaching implements to a vehicle comprising:

(a) a frame secured to the vehicle;

(b) a vertically-extending mast laterally slideable on said frame;

(c) an intermediate carriage slideably mounted for vertical movement up and down said mast;

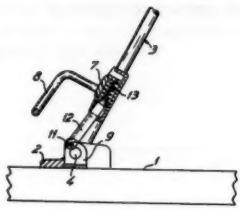
(d) first hydraulic means operatively associated with said mast and said intermediate carriage for raising and lowering said carriage up and down said mast;
(e) a mounting plate mounted on said carriage to pivot about a horizontal pivot axis fixed in said carriage;
(f) second hydraulic means operatively associated with said carriage and said mounting plate for controlling the angular position of said mounting plate about said first axis between a first position in which said plate is inclined backwardly and a second position in which said plate is inclined forwardly; and
(g) attachment means on said mounting plate for releasably attaching said implement thereto.

4,504,078

SKI BINDING WITH BIASING MEANS

Reinhold Zoor, Munich, Fed. Rep. of Germany, assignor to Heinrich Wunder GmbH KG, Dachau, Fed. Rep. of Germany

Filed Feb. 23, 1982, Ser. No. 351,476
Claims priority, application Fed. Rep. of Germany, Mar. 3, 1981, 3107884
Int. Cl.³ A63C *9/02*
U.S. Cl. 280—615 **20 Claims**



1. A binding for a cross-country ski comprising:
(a) ski boot retaining means having first means defining a first pivot axis in the region of the toe, and second means defining a second pivot axis, said retaining means being pivotally mountable on a ski for rotation on said first axis between a first position in which said retaining means is located adjacent to the ski and a second position in which said retaining means is pivoted away from the ski, and said second axis being fixed relative to the ski when said retaining means is mounted thereon and being spaced from the upper surface of the ski by a different distance than said first axis as considered in a direction normal to the upper surface of the ski; and
(b) biasing means for biasing said retaining means from the second position to the first position, said biasing means including a biasing element having opposite ends, and one of said ends being arranged to exert a force against said retaining means while the other of said ends is connected with and arranged to exert a force against a pivot located on said second axis, said one end being disposed between said first axis and the trailing end of the ski at least when said retaining means is in its first position, and said biasing element being designed to undergo a change in length during movement of said retaining means between the first and second positions.

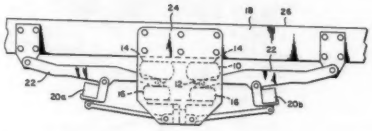
4,504,079

SWAY BAG SUSPENSION SYSTEM

John R. Strong, Kirkland, Wash., assignor to Paccar Inc., Bellevue, Wash.

Filed Jul. 25, 1983, Ser. No. 516,576
Int. Cl.³ B60G *5/04*
U.S. Cl. 280—683 **16 Claims**

1. An air bag assembly for use in a vehicle suspension system utilizing a plurality of air bag assemblies to suspend a vehicle chassis above a plurality of transversely spaced wheels, the air bag assembly comprising:
a piston member including means for coupling the piston member to a corresponding wheel for movement therewith such that the piston member will be displaced when the wheel moves relative to the chassis;
a first air bag engaging the piston member for compression thereby when the piston member is displaced by movement of a corresponding wheel toward the chassis, the first air bag being inflatable with pressurized fluid, to produce an opposing force which resists compression of the air bag by the piston member;
a second air bag engaging the piston member for compression thereby when the piston member is displaced by movement of its corresponding wheel away from the chassis, the second air bag being inflatable with pressurized fluid, to produce an opposing force which resists compression of the air bag by the piston member;



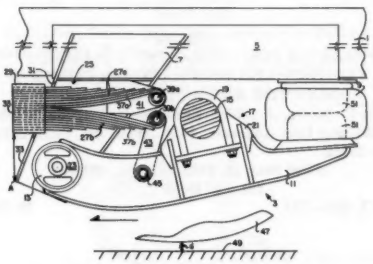
means for limiting the combined values of the opposing force of the first air bag and the opposing force of the second air bag such that the combined value will not increase to the extent otherwise occurring as the result of fluid pressure increases which occur during compression of an air bag; and
means for interconnecting the first air bag and the second air bag with the air bags of other air bag assemblies within the system.

4,504,080

LEAF SPRING LIFT AXLE SUSPENSION SYSTEM

Ervin K. VanDenberg, Massilon, Ohio, assignor to Turner Quick-Lift Corporation, Canton, Ohio

Filed May 16, 1983, Ser. No. 494,825
Int. Cl.³ B60G *11/46*
U.S. Cl. 280—704 **11 Claims**



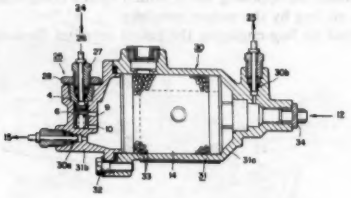
1. In a lift axle suspension system for a frame membered wheeled vehicle, including normally upwardly biasing means for raising a wheel-bearing axle of said vehicle from the road surface and means for lowering the wheel-bearing axle into road surface engagement by acting against the normal bias of said normally upwardly biasing means, the improvement comprising as said normally upwardly biasing means:
a first and second leaf spring connected at one of their ends to each other;
said first leaf spring having its opposite end connected to the frame of the vehicle; and
said second leaf spring having its opposite end connected to the wheel-bearing axle.

4,504,081

CHECK VALVE IN PRESSURE CONTROL CIRCUIT

Yasuo Shimizu; Nobuyoshi Asanuma, and Yozo Kami, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 30, 1982, Ser. No. 429,313
Claims priority, application Japan, Mar. 11, 1982, 57-39232
Int. Cl.³ B60G *11/26*
U.S. Cl. 280—714 12 Claims



1. In a pressure control circuit including an integrated valve unit, said integrated valve unit comprising a case having a longitudinal axis, a first inlet, a second inlet, a first outlet, and a second outlet; a drier wholely contained in said case; and a check valve formed and positioned in said second inlet and having a longitudinal axis perpendicular to said axis of said case, said check valve comprising:

a cylinder chamber formed in said case and having two end faces and a side wall,

a fluid inlet port formed in one of said end faces,

a pair of discharge ports formed in said side wall longitudinally spaced apart from each other and opening into said case,

an axially slideable piston member inserted in said cylinder chamber, said piston member being capable of selectively closing said discharge ports upon axial sliding thereof,

a biasing member urging said piston member toward said one end face having said fluid inlet port formed therein, and

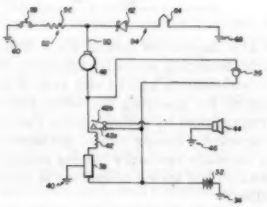
an elastic seal member fixed to said piston member, said elastic seal member being capable of sealing the portion of said one end face, including said fluid inlet port as said piston member slides toward said one end face.

4,504,082

APPARATUS FOR OPERATING A PLURALITY OF CONTROL CIRCUITS HAVING A COMMON CONDUCTOR AND A CIRCUIT THEREFOR

Milton F. Brown, Jr., 2035 Echo Cover, Virginia Beach, Va. 23454, and Darl Anderson, 4425 Jeanne St., Virginia Beach, Va. 23462

Filed May 31, 1983, Ser. No. 499,464
Int. Cl.³ B60R *21/00*
U.S. Cl. 280—735 28 Claims



1. A multi-purpose common conductor electrical system for use with a vehicle steering assembly or the like, comprising:

(a) a steering assembly having a rotable steering wheel adapted for directing a vehicle;

(b) first and second control circuits connected to said steering wheel and rotable therewith;

(c) a common conductor connected to said first and said second control circuits and extending along at least a portion of the length of said steering assembly;

(d) a power supply connected to said common conductor for providing power to said first and second control circuits;

(e) blocking means for preventing the unintended conducting of power to said first control circuit when power is conducted to said second control circuit;

(f) limiting means for intentionally diverting excess power to said first control circuit when power is conducted to said second control circuit for permitting simultaneous operation of said first and said second control circuit;

(g) first intiation means mounted to said vehicle remote from said steering assembly and connected to said first control circuit through said common conductor for initiating operation of said first control circuit; and,

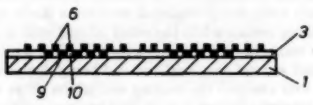
(h) said second control circuit includes a second initiation means mounted generally to said steering wheel and an operator mounted to said vehicle remote from said steering assembly and connected to said second control circuit through said common conductor.

4,504,083

GUILLOCHE IDENTIFICATION CARD

Ludwig Devrient, Vaterstetten, and Wolfgang Gauch, Otterfing, both of Fed. Rep. of Germany, assignors to GAO Gesellschaft fur Automation und Organisation mbH, Munich, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 125,298, Feb. 27, 1980, abandoned. This application Jun. 28, 1982, Ser. No. 392,434
Claims priority, application Fed. Rep. of Germany, Feb. 28, 1979, 2907809
Int. Cl.³ B24D *15/00*
U.S. Cl. 283—77 16 Claims



1. In an identification card having a photographically developable layer on which a security pattern is printed after which pictures and/or signs are recorded photographically on said layer, the improvement comprising a security pattern formed of transparent ink for preventing development of the photographically developable layer disposed therebeneath and providing a predetermined color with said underlying developable layer which is indicative of said developable layer in the undeveloped state when said photographically developable layer is viewed therethrough, whereby the undeveloped nature of said photographically developable layer is readily visible beneath said security pattern.

4,504,084

DOCUMENTS CONTAINING INFORMATION INVISIBLE TO THE NAKED EYE

Karl Jauch, Le Lignon, Switzerland, assignor to Sodeco-Saia AG, Geneva, Switzerland

Continuation of Ser. No. 80,142, Sep. 28, 1979, abandoned, which is a continuation of Ser. No. 844,284, Oct. 21, 1977, abandoned. This application Jan. 30, 1984, Ser. No. 575,377

Claims priority, application Switzerland, Oct. 28, 1976, 13592/76

Int. Cl.³ B42D *15/00*

U.S. Cl. 283—94 **4 Claims**

1. A document containing information not visible to the naked eye comprising:

an information support having an information-containing marking on said support, said marking being comprised of a first color which is printer's black, said first color being at least partially opaque for light in at least a portion of an invisible light spectrum consisting of the infrared light spectrum, and a second color consisting of a mixture of colors, the absorption ranges of which cover the entire visible light spectrum, said second color concealing said first color in the visible light spectrum, but being transparent to light in said infrared light spectrum, said information-containing marking being comprised of a variable mixture of said first and second colors, said mixture being variable in order to produce a marking of desired opacity to said infrared light spectrum.

4,504,085

REEL ASSEMBLY AND CLAMPING DEVICE

Harold G. Sachleben, Sr., Bellmawr, N.J., assignor to Allied Corporation, Morris Township, Morris County, N.J.

Division of Ser. No. 909,427, May 25, 1978, Pat. No. 4,212,606. This application Feb. 22, 1980, Ser. No. 123,862

Int. Cl.³ F16L *55/00*

U.S. Cl. 285—119 **12 Claims**

1. Apparatus for bringing into proximity and connecting a first member and a second member, said apparatus comprising:

(A) a first keeper element, which is mounted on one of said members;

(B) a reel assembly, comprising:

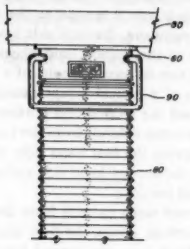
(1) a reel, which is mounted to the other of said members;

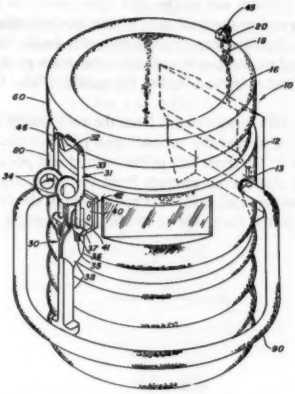
(2) a cable, which is engaged at one end to said first keeper element and which is fastened at its other end to and which retracts by means of said reel; and

(3) means for biasing said reel to retract said cable;

(C) a second keeper element, which is mounted on one of said members; and

(D) a clamp which is mounted on the other of said members and which comprises a drawpiece, said drawpiece comprising at least one leg, said leg being formed of a rod and having a catch at one end thereof, said leg terminating at its other end in means for mounting to said clamp, said leg describing a coil intermediate to its said ends, said catch being engaged with said second keeper element to connect





said members after said members are brought into proximity by said cable retracting by means of said reel.

4,504,086

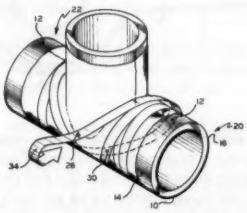
PIPE TEE

Guy E. Carrow, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jan. 10, 1983, Ser. No. 456,892

Int. Cl.³ F16L *41/00, 47/00*

U.S. Cl. 285—156 **13 Claims**



1. A plastic pipe tee having a straight run, the straight run having a back side, a front side opposite from the back side, a first hand side between the back side and the front side, and a second hand side opposite to the first hand side, wherein the front side bears a branch which divides the straight run into a first end portion and a second end portion and the intersection between the branch and the straight run passes through a first

apex point on the first hand side and a second apex point on the second hand side, each of the first apex point and the second apex point being the point at which a straight line following the surface of the straight run is tangent to the intersection of the branch and the straight run, the back side having a center point which is opposite to the branch, said plastic pipe tee having deposited thereon one or more circuits of a winding comprising a combination of 6 helical wraps extending between the first end portion and the second end portion;

wherein the first wrap extends from the front side of the first end portion across the first hand side, the center point of the back side, the second hand side and to the front side of the second end portion;

wherein the second wrap extends from the front side of the second end portion, across the first hand side, the center point of the back side, the second hand side and to the front side of the first end portion;

wherein the third wrap extends from the front side of the first end portion across the first apex point on the first hand side and to the back side of the second end portion;

wherein the fourth wrap extends from the back side of the second end portion, across the second apex point on the second hand side, and to the front side of the first end portion;

wherein the fifth wrap extends from the back side of the first end portion, across the second apex point of the second hand side, to the front side of the second end portion; and

wherein the sixth wrap extends from the front side of the second end portion, across the apex point of the first hand side, and to the back side of the first end portion.

4,504,087

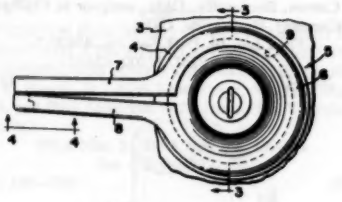
LEVER ATTACHMENT FOR A ROTARY DOOR KNOB

Alfred C. Pennington, G-13116 North Belsay Rd., Millington, Mich. 48746

Continuation-in-part of Ser. No. 163,945, Jun. 30, 1980, abandoned. This application Jul. 16, 1981, Ser. No. 283,895

Int. Cl.³ E05C *21/00*

U.S. Cl. 292—347 **15 Claims**



1. A lever attachment for a rotary knob comprising an arcuate collar having at its opposite ends arms of substantially equal length extending away from said collar and terminating in free ends, said collar being formed on an arc such that said collar may embrace said knob with said arms diverging from said collar, said collar being formed of material sufficiently resilient to enable said collar to be radially contracted and said arms to overlie and engage one another adjacent their free ends, and said collar having a groove in its inner surface flanked by a pair of parallel ribs; and latch means remote from said collar and releasably maintaining the free ends of said arms in engagement with each other, thereby maintaining said collar in radially contracted condition.

4,504,088

LIFTING DEVICE

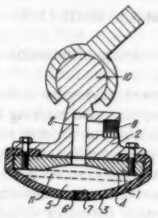
Donald Carter, 21 Kelvedon Green, Kelvedon Hatch, Brentwood, Essex, England

Filed Nov. 17, 1982, Ser. No. 442,241

Claims priority, application United Kingdom, Nov. 18, 1981, 8134801; Jul. 21, 1982, 8221045

Int. Cl.³ B66C *1/04*

U.S. Cl. 294—65.5 **5 Claims**



1. A lifting device for lifting magnetically attractable material comprising a magnet having an operating surface, a non-magnetic contact member covering the operating surface of the magnet to form a substantially fluid tight chamber between the operating surface and the contact member, fluid passage means communicating with the fluid chamber and adapted to be connected to a source of fluid under pressure to move the contact member relative to the operating surface from a first position contiguous with the operating surface to a second position away from the operating surface, and a fluid release means through which fluid is released when the contact member is in the second position to limit said relative movement.

4,504,089

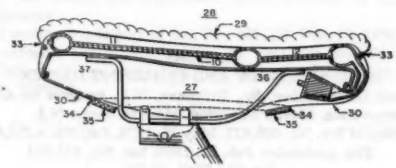
LIQUID-CUSHIONED BICYCLE SEAT

Nathaniel Calvert, 3102 Crescent La. NW., and George L. Battey, 807 13th Ave. NE., both of Rochester, Minn. 55901

Filed Jan. 25, 1982, Ser. No. 342,131

Int. Cl.³ B62J *1/18*

U.S. Cl. 297—214 **2 Claims**



1. A liquid-cushioned bicycle seat comprising:

a. A bladder having a broader saddle portion and a narrower, elongated pommel portion extending generally centrally of and forwardly from said saddle portion, wherein said bladder is composed of a top sheet of a liquid impervious material and a bottom sheet of a liquid impervious material joined together at their outer edges so as to form an outer seam and further joined along a diaphragm so as to define therein a saddle compartment and a pommel compartment wherein said saddle compartment is hydrostatically isolated from said pommel compartment;

b. A barrier formed within said saddle compartment extending from said diaphragm rearwardly into said saddle compartment but short of said outer seam so as to define within said saddle compartment a first zone and a second zone positioned on opposite sides of said barrier, said first zone and said second zone being in fluid communication

across a constriction defined by the interior projection of said barrier and said outer seam,

c. Separate stopper means for independently filling said saddle compartment and said pommel compartment with a liquid cushioning medium comprising:

i. Separate conically shaped collars projecting into either of said saddle compartment or said pommel compartment, respectively, and

ii. Separate conically shaped stoppers of such size and dimension as to matingly fit into either of said collars, respectively, being secured therein by friction so as to contain any liquid placed within either said saddle compartment of said pommel compartment upon the exertion of hydrostatic pressure; and

d. A cover for securing said bladder in snug supportive engagement with a bicycle seat when said bladder is placed upon a bicycle seat and said cover is placed around said bladder and bicycle seat, comprising:

i. A seat portion constructed of a breathable material;

ii. A skirt portion constructed of a material having a smooth surface having one end attached to the periphery of said seat portion; and

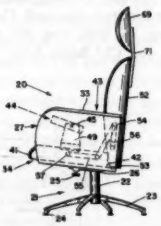
iii. Elastic means for drawing a second end of said skirt portion around the bottom of the bicycle seat when the cover is in place.

4,504,090

SWIVEL, TILT AND RECLINE ARM CHAIR

Paul R. Goldman, 8 Joyce Ter., Andover, Mass. 01810

Filed Oct. 20, 1982, Ser. No. 435,477
Int. Cl.³ A47C *1/02*
U.S. Cl. 297—342 **3 Claims**



1. In an arm chair, the combination of:

A U shaped arm rest body including a normally, substantially horizontal, central, platform and a pair of upstanding side walls each with an arm rest, each on an opposite side of said central platform and adapted to support the arms of an occupant;

swivel and tilt mechanism, supporting said central platform at about seat level above floor level for selective tilting or swivelling of said arm rest body;

a chair seat overlying said central platform of said arm rest body;

means supporting said chair seat from said upstanding side walls of said body for forward and rearward sliding movement; including a pair of tracks each on an opposite inside face of one of said upstanding side walls, each at an angle of about 30° from the horizontal and each having a follower slidable therein and attached to one of the opposite sides of said chair seat;

a back rest having a lower edge pivotally connected to the rearward edge of said chair seat and adapted to support the back of said occupant of said chair;

linkage means connecting an intermediate portion of said chair seat to an intermediate portion of said back rest so that forward movement of said seat moves said back rest rearwardly to reclining position and rearward movement of said seat moves said back rest forwardly to normal erect position; and

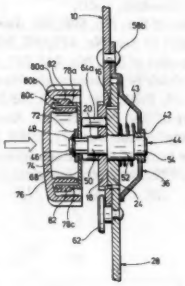
threaded means for locking said seat and said back rest in selected positions said threaded means comprising at least one set screw having a handle knob accessible from the outside face of one of said side walls of said body and having a tip extending through said side wall into contact with the follower of one of said tracks to frictionally lock said follower against said track.

4,504,091

RECLINING ANGLE ADJUSTMENT DEVICE

Hideyuki Ohshiro, Fujisawa, Japan, assignor to Shiroki Kinzoku Kogyo Kabushiki Kaisha, Kanagawa, Japan

Filed Aug. 31, 1982, Ser. No. 413,255
Int. Cl.³ A47C *1/025*
U.S. Cl. 297—362 **10 Claims**



1. A reclining angle adjusting device for a reclining seat, comprising:

a sole adjustment handle for fine adjustment and rough adjustment for adjusting a reclining angle;

a handle axle operatively connected for rotation by said sole adjustment handle;

an eccentric portion affixed to said handle axle;

an external gear supported by said eccentric portion of said handle axle and being rotatably mounted on said eccentric portion;

a first arm member including a first internal gear selectively engaging with said external gear, said first internal gear having more teeth than the number of teeth on said external gear;

a second arm member including a second internal gear engaging with said external gear;

spring means operatively connected to said device and acting along the axis of said handle axle for biasing said external gear into engagement with said first internal gear; and

shift means operatively connected between said handle and said external gear for shifting said external gear in a direction to be disengaged from said first internal gear against the biasing force of said spring means which presses said external gear into engagement with said first internal gear;

wherein said sole adjustment handle is rotated to perform fine adjustment of the reclining angle and is pressed to perform rough adjustment thereof.

4,504,092

TREATMENT OF CARNALLITIC ORES

Michel Bichara, Mulhouse; Jean-Pierre Koenagen, Lutterbach; Michel Bodu, Mulhouse; Michel Meriaux, Reidisheim, and Jean-Pierre Zimmermann, Mulhouse, all of France, assignors to Mines de Potasse d'Alsace S.A., Mulhouse, France

Filed Mar. 5, 1982, Ser. No. 355,057

Claims priority, application France, Mar. 5, 1981, 81 04391

Int. Cl.[3] C01D *3/08*; E21B *43/28*

U.S. Cl. 299—5 18 Claims

1. In a process for the treatment of carnallitic ores comprising the steps of contacting and decomposing the ore with a decomposition-brine containing amounts of $MgCl_2$, KCl and NaCl suitable for precipitating artificial sylvinite in a solution of $MgCl_2$ saturated in KCl and NaCl, the improvement which comprises adding to said decomposition-brine a collector for the flotation of KCl and a source of gas, said source of gas being a compound capable of liberating a gas in the brine, so as to contact newly formed crystal nucleii of KCl selectively with said collector and to contact bubbles of said gas with said collector so as to form a froth enriched in KCl simultaneously with the decomposition of said carnallite.

4,504,093

STRIPPER OSCILLATED HEAD WITH SHROUDED DRIVE AND QUICK DEMOUNTABILITY

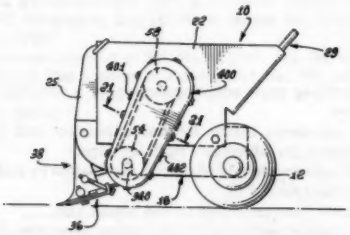
Palmer Grasse, 1407 Lee Dr., Glendale, Calif. 91201, assignor to Palmer Grasse, Glendale, Calif.

Continuation-in-part of Ser. No. 500,284, Jun. 1, 1983, , which is a continuation-in-part of Ser. No. 473,695, Mar. 9, 1983, , which is a continuation-in-part of Ser. No. 443,327, Nov. 22, 1982, Pat. No. 4,452,492, which is a continuation-in-part of Ser. No. 329,523, Dec. 10, 1981, Pat. No. 4,365,843, which is a continuation-in-part of Ser. No. 318,827, Nov. 6, 1981, Pat. No. 4,365,842. This application Jun. 27, 1983, Ser. No. 508,274

The portion of the term of this patent subsequent to Dec. 28, 1999, has been disclaimed.

Int. Cl.[3] A47L *11/12*

U.S. Cl. 299—37 22 Claims



1. For use in power-operated floor stripping apparatus that includes a frame, a drive carried on the frame, wheels supporting the frame, a handle to guide the frame, and a cutting blade carried by a head which is pivotally mounted to the frame, the frame having side members the improvement comprising

(a) a connecting element having a first tubular part and a second tubular part, said parts having spaced, parallel axes, said second tubular part pivotally connected to the head,

(b) a drive shaft extending within said first tubular part, said shaft operatively connectible to the drive to be rotated thereby, and

(c) support bearings removably attached to the frame side members, the drive shaft having end portions rotatably supported by the bearings,

(d) the frame side members having apertures into which the drive shaft extends, said apertures opening peripherally to pass and thereby free the drive shaft from the frame when the bearings are detached from the frame side members, whereby the drive shaft and said first tubular part may be demounted from the frame,

(e) the drive including a motor having a driven shaft, rotors on the driven shaft and drive shaft, and an endless drive member trained on said rotors,

(f) and a protective shroud operatively connected to the frame and extending about said rotors and drive member, the shroud including a removable panel which when removed provides access to the rotors and endless member trained thereon for adjustment or repair thereof,

(g) the head consisting of lightweight metal and having flange means defining two lugs,

(h) and bearings received in and carried by said lugs to support an associated pivot shaft removably connected to the frame.

4,504,094

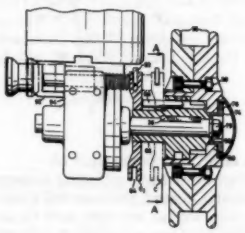
DRIVE MECHANISM FOR INVALID CARRIAGES

Donald L. Burrows, Utopia, Canada, assignor to Everest and Jennings Canadian Limited, Concord, Canada

Filed Sep. 16, 1982, Ser. No. 418,686

Int. Cl.[3] B60B *5/04*

U.S. Cl. 301—6 R 12 Claims



1. A selective drive mechanism for use in a powered invalid carriage, comprising:

a drive member and a driven wheel hub member journalled thereon for rotation about a common axis,

said members providing respective cooperating cylindrical bearing surfaces each having at least one axial groove, the wheel hub member being rotatable on the drive member for bringing the grooves of said members into alignment thereby to define at least one axially extending keyway,

a clutch member providing at least one axially extending key, said clutch member being movable axially between an engaged position in which the key extends along said keyway and a disengaged position in which the key is withdrawn from the keyway, and

means for selectively moving the clutch between its engaged and disengaged positions for selectively locking the driven wheel hub member to the drive member for rotation therewith and unlocking the driven wheel hub member from the driven member for independent rotation thereon.

4,504,095

WELDED DROP-CENTER VEHICLE WHEELS

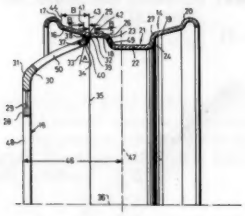
Michael F. Edwards, Wolverhampton, and John D. Mabon, Leicester, both of England, assignors to GKN Sankey Limited, England

Continuation-in-part of Ser. No. 822,512, Aug. 8, 1977, abandoned, which is a continuation of Ser. No. 598,656, Jul. 24, 1975, abandoned. This application Nov. 20, 1978, Ser. No. 962,345

Claims priority, application United Kingdom, Jul. 29, 1974, 33296/74; Apr. 22, 1978, 16001/78

Int. Cl.[3] B60B *3/02*

U.S. Cl. 301—63 R 12 Claims



1. A disc wheel comprising:

an asymmetrical rim having first and second axially spaced bead seats separated by a well and a ledge between the first bead seat and said well, and

a dish-shaped disc having its edge portion T-butt welded to the radially inner surface of the rim at a point adjacent to the transition from the first bead seat to the ledge such that the side of said edge portion closer to the well is located within a distance B/5 of the transition between the ledge and the first bead seat (where B is the minimum bead seat length of the standard to which the rim is made), and

wherein the center line of the edge portion of the disc, when viewed in radial section, makes an angle of between 0° and 30° with a plane perpendicular to the rotary axis of the wheel and passing through the intersection of the center line and said inner surface to which the edge portion is welded, the edge portion extending away from the welded joint in a direction so as to lie partly within the first bead seat.

4,504,096

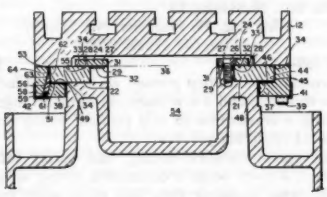
SELF-ADJUSTING GIB FOR MACHINE TOOLS AND THE LIKE

Gerald V. Roch, Indianapolis, Ind., assignor to Hurco Manufacturing Co., Inc., Indianapolis, Ind.

Filed Jan. 28, 1983, Ser. No. 462,133

Int. Cl.[3] F16C *23/02*

U.S. Cl. 308—3 A 17 Claims



1. Self-adjusting gib apparatus for a machine tool comprising:

a support unit having first and second elongate guide means thereon which extend along parallel lines and are spaced from each other;

a slide unit slidably mounted on said support unit, said slide unit having first and second gib means thereon,

said first and second gib means having first and second bearing surface means, respectively, engaging said first and second guide means, respectively,

said first gib means including backing surface means inclined at a locking angle relative to said first bearing surface means;

said first gib means including an aperture in a wall thereof, and including a gib block slidably received in said aperture, and slidable therein in a direction toward said first guide means,

said backing surface being a wall of said aperture facing said first guide means and guidingly engaging and confining said gib block in said slide unit.

4,504,097

RETURN HOLE OF A ROLLER BEARING FOR ENDLESS LINEAR MOTION

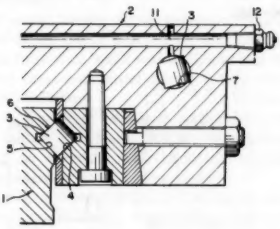
Tatsuo Mottate, Mitaka, Japan, assignor to Nippon Thompson Co. Ltd., Tokyo, Japan

Filed Oct. 19, 1983, Ser. No. 543,322

Claims priority, application Japan, Mar. 15, 1983, 58-38164[U]

Int. Cl.[3] F16C *29/06*

U.S. Cl. 308—6 C 10 Claims



1. A return hole of a roller bearing for an endless linear motion wherein a casing mounted on a track rail of a linear shape can make an endless linear motion through a plurality of rollers which circulate endlessly inside said casing, characterized in that the cross section taken perpendicular to the axial direction of a linearly shaped return hole provided inside said casing is formed by a concentrically shaped composite cross section consisting of a basic circular cross section and a square cross section, the diameter of said basic circular cross section being larger than the side length of said square cross section, and said return hole having a construction in which four right angle V grooves are formed on the periphery of said basic circular hole at even intervals and facing radially outwards.

4,504,098

ELECTROMAGNETIC BEARING FOR HIGH TEMPERATURE ENVIRONMENT

André P. Battarel, and Claude G. Lequin, both of Vernon, France, assignors to Societe Europeenne de Propulsion, Puteaux, France

Filed Nov. 4, 1983, Ser. No. 548,624

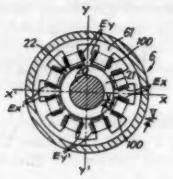
Claims priority, application France, Nov. 16, 1982, 82 19168

Int. Cl.[3] F16C *39/06*

U.S. Cl. 308—10 10 Claims

1. Electromagnetic bearing for a high temperature environment, comprising stator means and rotor means, said stator means including at least one electromagnet having a ferromagnetic stationary yoke and a coil assembly attached thereto, said coil assembly comprising at least one coil wound on said sta-

tionary yoke and said rotor means including an annular ferromagnetic rotor armature, wherein each said coil comprises at least one insulated conducting wire defining a warp and an



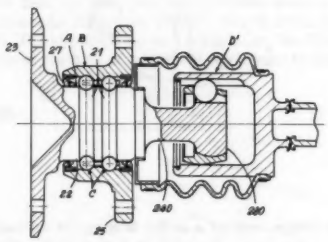
interwoven strip of insulating material defining a weft and wherein the insulated conducting wire and the interwoven strip of insulating material are embedded in a high temperature cement.

4,504,099

DRIVE-AXLE BEARING DEVICE FOR AUTOMOBILES

Yutaka Miki, Kawanishi; Masayuki Kuroda, Takarazuka, and Tetsumi Omori, Nishinomiya, all of Japan, assignors to NTN Toyo Bearing Company, Limited, Osaka, Japan

Continuation of Ser. No. 403,631, Jul. 20, 1982, abandoned. This application Jun. 1, 1984, Ser. No. 616,779
Claims priority, application Japan, Jan. 26, 1981, 56-10639
Int. Cl.³ F16C *19/08, 3/035;* **F16D** *3/46;* **B60B** *35/12*
U.S. Cl. 384—543 **2 Claims**



1. A drive axle and bearing unit for a rear drive wheel in a vehicle of the independent suspension type, comprising:

a bearing assembly including an outer member having two races formed on a inner peripheral surface thereof and also having a radial flange integrally formed thereon for connection to a vehicle;

a unitary solid one-piece inner shaft member having formed, all integrally therewith, a radial flange at one end thereof for attachment of a wheel, an inner joint member of a constant velocity universal joint at the other end thereof having a maximum outer diameter, and two races on an outer peripheral surface thereof intermediate said ends, said outer peripheral surface having a diameter that is greater than the maximum outer diameter of said inner joint member;

two rows of rolling elements interposed between said races of said inner shaft member and said outer member;

a slidable type constant velocity universal joint assembly including an outer joint member connected to a drive shaft and having linear, axially extending ball receiving grooves, said inner joint member extending through an axial opening of said outer joint member and having ball receiving grooves cooperative with those in said outer joint member, and a plurality of torque transmitting ball elements each received in a pair of said cooperating ball receiving grooves, said elements being so constructed that said drive axle and inner joint member may be removed from said vehicle and replaced as a single unit; and

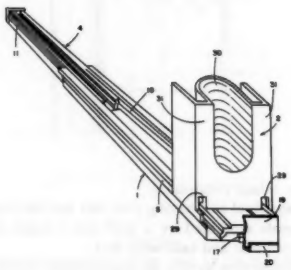
an elastic boot for covering said opening of said outer joint member.

4,504,100

APPARATUS FOR STORING AND DISPENSING PARALLELEPIPEDIC OBJECTS AND PACKETS, PARTICULARLY PACKETS OF CIGARETTES, BOXES AND OTHER ARTICLES

Yvette Chaumard, Impasse des Longènes-St.-Apollinaire, 21000 Dijon, France

Filed Jun. 23, 1982, Ser. No. 391,157
Claims priority, application France, Jun. 26, 1981, 81 12599
Int. Cl.³ A47F *1/12*
U.S. Cl. 312—71 **17 Claims**



1. Apparatus for storing and dispensing parallelepipedic objects such as boxes, packets or like articles, comprising

a main elongated body on which the objects are placed, one behind the other;

a push element mounted to slide longitudinally in said main body an elastic member urging the push element forwards so as to apply it against the last object in the line, an auxiliary body mounted to slide longitudinally in the main body, to extend the latter over a variable length;

guiding members on said push elements cooperating with guides on the main body and on the auxiliary body to ensure continuous guiding of the push element over the whole length of the telescopic assembly formed by the main and auxiliary bodies;

said main body having in its front part, ramps inclined upwardly and forwardly, said ramps being located plumb with the side walls of the main body; and

said push element comprises, in its lowest part, lateral notches adapted to overlap the two ramps.

4,504,101

LOW INSERTION FORCE CONNECTION ARRANGEMENT

William A. Reimer, Wheaton, Ill., assignor to GTE Automatic Electric Inc., Northlake, Ill.

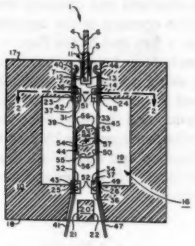
Filed Aug. 29, 1983, Ser. No. 527,637
Int. Cl.³ H01R *9/09*
U.S. Cl. 339—17 L **15 Claims**

1. In combination, a first printed wiring board including at least one terminal, and a low insertion force arrangement for establishing a connection to said printed wiring board, said arrangement comprising:

at least one connection spring, said spring including a contact, a pivot point, a connection spring terminal, and an acutator engaging area, said pivot point located between said contact and said actuator engaging area, said contact engageably positioned relative to said printed wiring board terminal and said connection spring terminal permitting connection to external points;

a fulcrum positioned to engage said spring at said pivot point; and

an actuator located proximate to said spring at said actuator engaging area, said actuator positioned in a first position



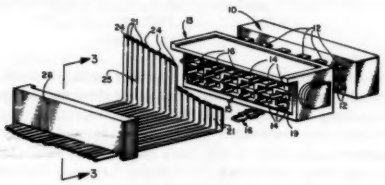
relative to said spring to pivot said spring and engage said contact with said printed wiring board terminal, and positioned in a second position relative to said spring to pivot said spring and disengage said contact from said printed wiring board terminal.

4,504,102

ELECTRIC CONNECTING SYSTEM

Augustine Wakuluk, Bethel, Conn., assignor to T-Bar Incorporated, Wilton, Conn.

Filed Sep. 23, 1982, Ser. No. 421,855
Int. Cl.³ H01R *13/62*
U.S. Cl. 339—18 R **10 Claims**



1. An electrical connecting system for connecting electrical terminals supported at fixed positions on a unit with electrical conductors in a predetermined array comprising:

conductor-support means for supporting said conductors in said predetermined array;

an intermediate adapter unit providing a plurality of passages extending in generally parallel paths through the intermediate adapter unit located so that they will receive the respective terminals of the unit and having passage-defining walls with at least one generally flat reference wall parallel to the flat reference walls of other passages and opposing another wall of the passage;

a terminal connector member extending through each passage having a flat portion resting along the flat reference wall and a resilient portion extending between the passage-defining walls yielding to the respective terminals of said unit and thereby making good electrical contact with the terminals as said terminals are inserted into the passages; and

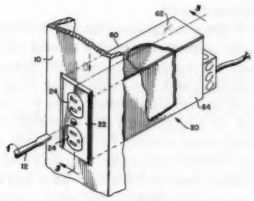
a conductor connector element for engaging and making electrical contact with the electrical conductors in said predetermined array having as an integral part an adapter member for conductively engaging said terminal connector member, said adapter member having resilient engagement means which bears against the flat portion of the terminal connector members resting against the flat reference wall of a passage and against the opposing wall of the passage and which is laterally narrower than the passage so that it may be variously positioned in the passage to achieve conductive engagement with the terminal connector member at different orientations to enable said conductor connector element to be moved laterally in its passage in order to be positioned to engage a predetermined corresponding conductor in said array.

4,504,103

COMBINATION ELECTRICAL OUTLET AND LOCK BOX

John Woedl, 4748 Booth Rd., Oxford, Ohio 45056

Filed Sep. 21, 1982, Ser. No. 420,808
Int. Cl.³ H01R *13/44*
U.S. Cl. 339—34 **8 Claims**



1. A combination lock box and electrical outlet assembly which is adapted to be positioned behind a wall or panel, said assembly comprising:

(a) an outer sleeve having at least one open end and an upper wall, said outer sleeve comprising first and second rear walls, a bottom wall, and a rear wall, said rear wall including a live electrical outlet connected to the electrical system of a building;

(b) a lock box slidably received within said outer sleeve through said open end, said lock box having front and rear ends, and an electrical outlet faceplate attached to said front end aajacent to said open end;

(c) a releasable latching mechanism for locking said lock box within said outer sleeve, said latching mechanism comprising engaging elements positioned on said lock box and said sleeve; and

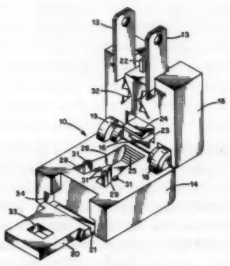
(d) means for biasing said lock box outwardly of the sleeve when the latching mechanism is released.

4,504,104

UNITARY WIRING DEVICE BODY

Henry Leong, Kendall Park, and John Flumefreddo, Colonia, both of N.J., assignors to Challenger Circle F, Inc., Trenton, N.J.

Filed Oct. 18, 1983, Ser. No. 541,803
Int. Cl.³ H01R *13/502, 13/58*
U.S. Cl. 339—63 R **5 Claims**



1. An electrical connector comprising:

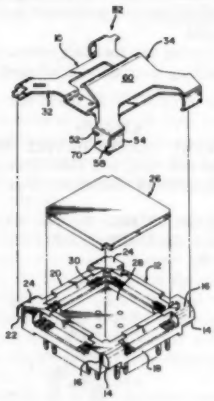
(a) a one-piece body molded of electrically insulative material and including
(1) a first segment having intermediate its ends a recess shaped to accept an electric cord,
(2) a first flexible web integral with one end of the first segment;
(3) a second segment integral at one end with said web, said web hingedly connecting the segments at said one end thereof for relative swinging movement of the segments between an open position exposing said recess and a closed position in which the segments are in face-to-face contact to close the recess, said second segment having an entry hole for the cord which communicates with the recess in the closed position of the segments,
(4) a second flexible web integral with the other end of the first segment, and
(5) a latch piece integral at one end with the second web and hingedly connected thereby to said other end of the first segment for swinging movement between a disengaged position in which the latch piece frees the segments for swinging movement to their open position, and a latching position in which, with the segments closed, portions of the latch piece overlie the other ends of both segments, the other end of the second segment and the portion of the latch piece that overlies the same having mating means latchingly interengaging the latch piece with the second segment when the segments and the latch piece are in closed and latching positions respectively; and
(b) a pair of contacts mounted in the second segment, having a means that projects into the recess responsive to the closing and latching of the segments to electrically connect the contacts to the cord.

4,504,105

RELEASE MECHANISM FOR A CONNECTOR COVER

Lee A. Barkus, Millersburg, and Edward J. Bright, Elizabethtown, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Sep. 21, 1982, Ser. No. 420,761
Int. Cl.³ H01R *13/506*
U.S. Cl. 339—75 MP **4 Claims**



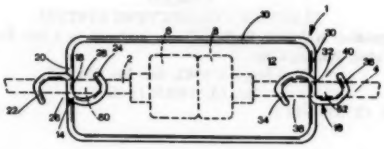
1. A release mechanism for releasing a cover on a connector housing having corners, said cover being of the type having arms extending to the housing corners, latches attached to the arms which include a depending member with an inwardly projecting lip at a free end for being latched under shoulders on the housing and laterally projecting tabs including a first tab being on each arm near the latch and a second tab being on each depending member near the lip; said release mechanism comprising:
a. a plate;
b. a pair of arms attached to and extending from each of two adjacent corners of the plate;
c. a flap attached to and depending from the side of each arm and having a first notch positioned near the arm to which the flap is attached and opening towards the plate and a second notch opening in the opposite direction and positioned near a free end of the flap;
said release mechanism being attached to the cover by each flap extending along a side of a depending member with the first tab received in the first notch and the second tab received in the second notch and the plate overlying some of the cover, said release mechanism operable by pushing down on the plate to rotate the flaps up and out which draws the lips out from beneath the shoulders via the second tabs being positioned in the second notches.

4,504,106

ELECTRICAL CORD SECURING APPARATUS

Max Fechter, 572 St. Charles St., Victoria, British Columbia, Canada V8S 3N7

Filed May 31, 1983, Ser. No. 499,295
Int. Cl.³ H01R *13/639*
U.S. Cl. 339—75 P **4 Claims**



1. An apparatus for securing together electrical cords having mutually engaged electrical contacting devices, the apparatus comprising a hoop-shaped body, the electrical contacting devices being receivable within the body, and two S shaped members connected to the body on opposite sides thereof so the electrical contacting devices are between the members, each of the S shaped members having a center bar extending perpendicular to the longitudinal direction of the cords and two hook portions facing in opposite directions connected to the bar on opposite sides thereof, each of the members being shaped to tightly receive a loop of one of the cords so the one cord passes over the hook portions on one side of the member and over the center bar on a side of the member opposite the one side.

4,504,107

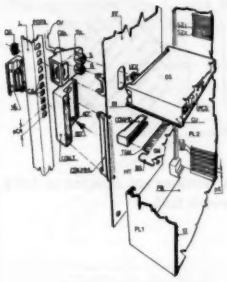
PITCH VARIATORS FOR SUB-RACK CONNECTORS

Carlo Zingrini, Milan, and Maurizio Oreglio, Bellinzago Lombardo, both of Italy, assignors to Telettra-Telefonia Elettronica E Radio S.p.A., Milan, Italy

Continuation of Ser. No. 279,937, Jul. 2, 1981, abandoned. This application Nov. 22, 1983, Ser. No. 554,166
Claims priority, application Italy, Jul. 16, 1980, 23475 A/80
Int. Cl.³ H01R *13/518*
U.S. Cl. 339—125 R **17 Claims**

1. In a rack for housing a wide range of subrack modules containing circuit units for telecommunications or other electronic equipment of the type wherein the external connectors of the circuit units are connected with rack connections carried by corresponding rack connectors affixable to rack uprights at positions CA and displaceable on the rack uprights between positions CA in increments pCA, and wherein each circuit unit with its external connector is displaceable within the module between subpositions S in subincrements pS, the improvement comprising pitch variator connector means for adapting a position of one of said rack connections to a dis-

placement pS of a corresponding external connector, said pitch variator connector means including a transition piece affixable to the rack upright at available positions CA and a support body for said rack connection adapted for displaceable engagement with said transition piece, said support body being dis-



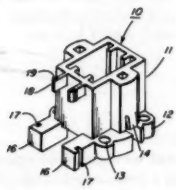
placeable with respect to said transition piece in subincrements pSCA between subpositions SCA corresponding to subpositions S and being engageable with said transition piece at each of the subpositions SCA, so that said rack connection position is adaptable to displacements pS of the corresponding external connector.

4,504,108

WIRING DEVICE FOR MOUNTING ON SHEET METAL

John Fiumefreddo, Colonia, N.J., and Julius F. Tibolla, Yardley, Pa., assignors to Challenger Circle F, Inc., Trenton, N.J.

Filed Sep. 19, 1983, Ser. No. 533,679
Int. Cl.³ H02B 1/02
U.S. Cl. 339—128 **3 Claims**



1. A wiring device for mounting on sheet metal comprised of a body;
a flange at one end of said body, said flange having holes for screws affixed to said sheet metal;
at least one barb extending from said body in proximity to said flange for engaging the edges of a hole in the sheet metal between said barb and said flange;
at least one leg extruding from said flange; and
at least one prong extending from said body, said flange and legs having notches for engaging openings in said sheet metal.

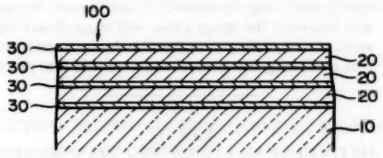
4,504,109

INFRARED SHIELDING LAMINATION

Yasunori Taga, and Yutaka Sawada, both of Aichi, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi, Japan

Filed Nov. 19, 1982, Ser. No. 442,972
Claims priority, application Japan, Nov. 25, 1981, 56-188950
Int. Cl.³ G02B 5/22, 5/28
U.S. Cl. 350—1.6 **14 Claims**

1. A multi-layer infrared shield comprising a visible light transparent substrate and an overlying composite lamination consisting of at least one infrared shield layer and at least one interferential reflection layer alternately lying on each other, said infrared shield layer having a thickness of about $\lambda/4N_A$ (where λ stands for the wave-length at the center of the near-infrared spectrum and N_A stands for the refractive index of the infrared shield layer at the wavelength λ) which permits the transmission of visible light while absorbing far-infrared rays,



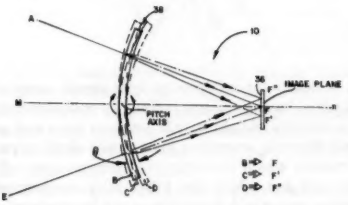
thereby preventing the transmission of far-infrared rays, and said interferential reflection layer having a thickness of about $\lambda/4N_B$ (where N_B stands for the refractive index of the interferential reflection layer at said wavelength λ) which permits the transmission of visible light and, in cooperation with said infrared shield layer, reflects near-infrared rays, thereby preventing the transmission of near-infrared rays.

4,504,110

CONVERGING BEAM LINEAR OPTICAL SCANNER

Robert L. Pittenger, Orange, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed May 19, 1983, Ser. No. 496,145
Int. Cl.³ G02B 27/17, 17/00
U.S. Cl. 350—6.3 **16 Claims**



1. A converging beam linear optical scanning system adapted to receive essentially collimated light rays from object space, the light rays passing through the converging beam linear optical scanning system in image forming relation, to form an image on a relatively flat image plane, said optical scanning system being adapted to converge and focus the collimated rays and to periodically and reciprocally displace the image on said relatively flat image plane, said converging beam linear optical scanning system comprising:
an objective lens system for receiving essentially collimated light rays from object space and for converging said essentially collimated light rays along an optical axis to form a relatively flat image field on said relatively flat image plane; the optical axis of said objective lens system being incident on said relatively flat image plane;
a meniscus lens having a vertex, said optical axis passing through said vertex, said meniscus lens being shaped to have essentially zero optical power;
means for supporting and gimballing said meniscus lens on at least a first pivot axis, said first pivot axis being orthogonal to said objective lens optical axis and positioned to cross said optical axis between said objective lens and said image plane, said meniscus lens position being selected to have said meniscus lens receive the converging light rays

from said objective lens system and to transmit said converging light rays to said relatively flat image plane;

means for periodically and reciprocally oscillating said meniscus lens through a reciprocal predetermined pivotal angular displacement on at least said first pivot axis, said means for oscillating said meniscus lens being coupled to said means for supporting and gimballing said meniscus lens;

whereby, said image is periodically and linearly displaced on said relatively flat image plane, said image linear displacement corresponding in distance and time to said meniscus lens oscillating first pivotal angle on said first pivot axis.

4,504,111

METHOD OF MULTIPLEXING TRANSMISSION CHANELS IN A STEP-INDEX OPTICAL FIBRE AND DEVICE FOR CARRYING OUT THE METHOD

Jean J. Hunziager, Paris, France, assignor to U.S. Philips Corporation, New York, N.Y.

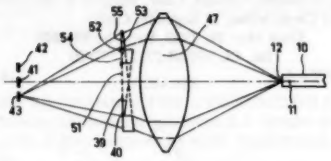
PCT No. PCT/NL82/00004, § 371 Date Jun. 14, 1982, § 102(e) Date Jun. 14, 1982, PCT Pub. No. WO82/02956, PCT Pub. Date Sep. 2, 1982

PCT Filed Feb. 17, 1981, Ser. No. 394,993

Claims priority, application France, Feb. 23, 1981, 81 03527

Int. Cl.³ G02B 5/14

U.S. Cl. 350—96.20 **16 Claims**



1. A device for multiplexing light signals comprising a step-index fibre having an input end and an optical means for directing a plurality of light signals onto said input end, said optical means directing respective light signals along respective conical regions which converge to a common apex adjacent said input end and which are rotationally symmetrical about a common axis which is parallel to the longitudinal axis of said fibre so as to form in said fiber a plurality of channels for transmitting said light signals, each of said channels being formed by a group of light rays which propagate along said fibre through consecutive total reflections at the core/cladding interface of said fiber at a given range of angles relative to said longitudinal axis of said fibre.

4,504,112

HERMETICALLY SEALED OPTICAL FIBER

Gordon Gould, Great Falls, Va.; Charles I. Soodak, Silver Spring, Md., and Robert E. Thompson, Roanoke, Va., assignors to Chevron Research Company, San Francisco, Calif.

Filed Aug. 17, 1982, Ser. No. 408,971

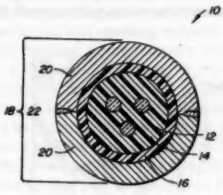
Int. Cl.³ G02B 5/16

U.S. Cl. 350—96.23 **13 Claims**

1. A hermetically sealed optical fiber working tube for use in environments requiring resistance to buckling under pressure and inelastic stretching thereof when subjected to longitudinal elongation, relaxation and bending forces, said tube comprising:

an inner core having one or a plurality of buffered optical fibers; and

at least two metal sections fitting together around said inner core and forming a cylindrical tube, said metal sections hermetically joined into said tube, wherein said metal sections were preshaped by rolling from an annealed wire



and said metal sections are selected to have a yield strain greater than about 0.85.

4,504,113

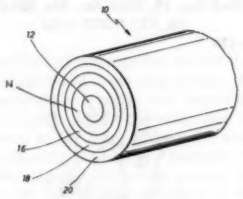
REINFORCED AND CHEMICALLY RESITANT OPTICAL FILAMENT

Tryggve Baak, Carlsbad, Calif., assignor to Schlumberger Technology Corporation, Houston, Tex.

Filed Nov. 2, 1981, Ser. No. 317,675

Int. Cl.³ G02B 5/14

U.S. Cl. 350—96.33 **12 Claims**



8. An optical filament waveguide, comprising:

a rod transparent to a preselected range of electromagnetic radiation and having a first index of refraction in the core thereof and a different index of refraction at the periphery thereof such that said electromagnetic radiation will propagate along the longitudinal axis of said rod;

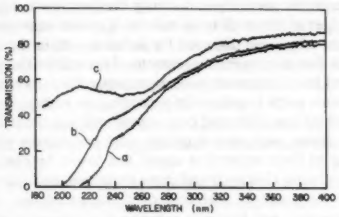
a thin protective coating of a zirconia-containing glass around the periphery of said rod, the radial thickness of said coating being thin relative to the diameter of said rod, and the coefficient of thermal expansion of said zirconia-containing glass being within about one order of magnitude of the coefficient of thermal expansion of the periphery of said rod, said protective coating providing better resistance to chemical attack by water and other corrosive chemicals and to mechanical attack by abrasion and stress than the periphery of said rod; and

a second thin protective coating of a metal oxide around the periphery of said zirconia-containing glass, said metal oxide selected from the group consisting of tin dioxide, titanium dioxide, zirconium dioxide, hafnium dioxide, zirconium-hafnium double oxides and hafnium-titanium double oxides and said metal oxide coating being characterized by having a thin radial thickness relative to the diameter of said rod and by having a coefficient of thermal expansion being within about one order of magnitude of the coefficient of thermal expansion of said rod and said zirconia-containing glass.

4,504,114
METHOD OF TRANSMITTING UV LIGHT THROUGH OPTICAL FIBERS

John P. Arrington, San Carlos, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Continuation-in-part of Ser. No. 376,863, May 10, 1982, abandoned. This application Jun. 7, 1984, Ser. No. 618,314
Int. Cl.³ G02B 5/172
U.S. Cl. 350—96.34 39 Claims



23. Apparatus comprising:

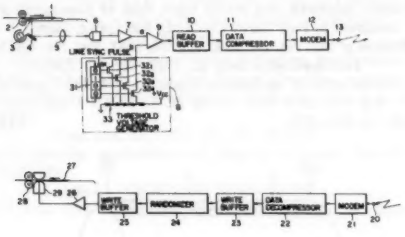
(a) an optical fiber, which fiber comprises a core consisting essentially of synthetic fused silica containing between 500 and 1500 ppm water and a cladding consisting essentially of flourine-doped synthetic fused silica; and

(b) means adjacent one end of said fiber and responsive to light at at least one wavelength less than 280 nanometers.

4,504,115
DIGITAL FACSIMILE COMMUNICATION SYSTEM CAPABLE OF REPRESENTING TONE DIFFERENCES

Mutsuo Ogawa, Yokohama, and Noboru Murayama, Tokyo, both of Japan, assignors to Ricoh Company, Ltd., Japan

Filed Jan. 21, 1982, Ser. No. 341,256
Claims priority, application Japan, Jan. 23, 1981, 56-9375
Int. Cl.³ H04N 1/00
U.S. Cl. 358—260 8 Claims



1. A digital facsimile communication system capable of representing tone differences comprising a transmitter, a receiver and a transmission line for connecting said transmitter with said receiver, said transmitter comprising:

analog-to-digital data converting means for converting analog image data obtained by photoelectrically scanning an original into binary image data with the use of a multilevel threshold, the level of which is varied for every predetermined number of said binary image data thereby forming groups of binary image data; and

data compressing means for compressing said binary image data in order to eliminate redundancy of information; and said receiver comprising:

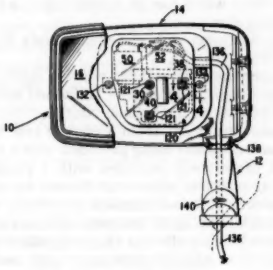
data decompressing means for decompressing said compressed binary image data transmitted over said transmission line; and

exchanging means for exchanging the binary image data between at least two of said groups of binary image data thereby forming an output signal.

4,504,116
REARVIEW MIRROR POSITIONABLE BY REMOTE CONTROL

Bernard C. Sharp, White Plains, N.Y., assignor to Parker-Hannifin Corporation, Shelton, Conn.

Filed Jun. 21, 1981, Ser. No. 275,681
Int. Cl.³ G02B 5/08; B60R 1/06
U.S. Cl. 350—637 13 Claims



1. In a rearview mirror positionable by remote control, including a mirror housing having an open side, a mirror supporting plate held in said open side and a motorized mechanism inside the housing for disposing said plate at desired viewing positions of a mirror fixed to the plate, the improvement wherein said mechanism comprises:

a plurality of mirror positioning rods displaceable longitudinally relative to said housing and having respective ends connected pivotably with the back of said plate at respective locations spaced away from each other

and means including for each of said rods a slippable connection between the rod and a drive transmission element of said mechanism for displacing the rod in or out to adjust the mirror position and for retaining the rod in adjusted position, each said connection being slippable to permit relative movement of the rod and its said drive transmission element under a force exceeding a normal driving force in either longitudinal direction of the rod, each said drive transmission element being rotatable on an axis transverse to the path of the related rod, each said connection comprising relatively slippable co-engaging surface formations respectively on the periphery of said transmission element and on and along a side of said rod,

each said drive transmission element having thereon a peripheral series of undulations movable thereby in a path directed longitudinally of the related positioning rod, each said rod having on and along a side thereof a series of undulations to mesh with undulations of its said drive transmission element, and means biasing together each said rod and its said drive transmission element so that respective undulations thereof normally are held in meshed engagement but will ride over one another under said force.

4,504,117

REAR VIEW MIRROR FOR VEHICLES WITH POTENTIOMETRIC ANGULAR POSITION DETECTORS

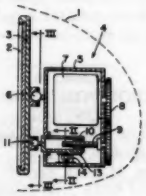
Bernhard Mittelhäuser, No. 57, D-3002 Wedemark 2, Fed. Rep. of Germany

Filed Apr. 12, 1983, Ser. No. 484,164

Claims priority, application Fed. Rep. of Germany, Apr. 14, 1982, 3213694

Int. Cl.[3] G02B 7/18; G05B 19/42

U.S. Cl. 350—636 13 Claims



1. A rear view mirror for vehicles, said mirror comprising:
a mirror body which can be adjusted about a horizontal and a vertical axis;
a device associated with said mirror body for ascertaining the position thereof;
a first potentiometric angular position detector associated with said adjustment about a horizontal axis;
a second potentiometric angular position detector associated with said adjustment about a vertical axis; and
each of said detectors being provided with a shaft which in turn is respectively provided with a pinion; which includes a respective adjustment element for said horizontal adjustment and for said vertical adjustment of said mirror body, with pivoting of the latter about an axis therewith respectively being effected by a longitudinal movement of the respective adjustment element; with each adjustment element being provided with a rack-like element which meshes with one of said pinions.

4,504,118

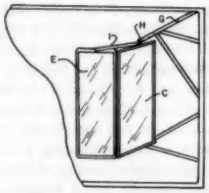
INDEPENDENTLY MOVEABLE EXTERNAL REAR VIEW MIRRORS WITH CONNECTED FRAME MOUNTS

Fred L. Harig, 1050 Hwy. 67, Florissant, Mo. 63031

Filed Dec. 17, 1982, Ser. No. 450,635

Int. Cl.[3] G02B 7/18

U.S. Cl. 350—626 1 Claim



1. A vehicle mirror for providing maximum vision for the driver, and for use in conjunction with an existing external rear view mirror and frame associated with the vehicle, comprising, an upper and lower bracket operatively associated with the rear view mirror and frame, said bracket disposed for extending directionally away from said existing mirror, a frame means, said frame means securing with the upper and lower brackets, and an additional mirror held by said frame means and being arranged for independent angular adjustment to supplement the rear viewing by the vehicle driver during reverse movements and turning, said additional mirror being pivotally mounted with respect to its support by the upper and lower brackets, and additional mirror and brackets being independently pivotally mounted with respect to the external rear view mirror and frame, said frame means surrounding the periphery of said additional mirror, and said frame means being connected with the upper and lower brackets, said frame means including a pair of frame parts that embrace at least the sides of the said additional mirror, each frame part being formed of a U-shaped channel having a central slot therein, with the central slot being arranged for embracing the proximate edges of the additional mirror, each frame part being arranged for location contiguously with the additional mirror side edges, and each frame part having upper and lower inturned ends for partially embracing the proximate upper and lower edges of the additional mirror, a gasket arranged upon the mirror edges and disposed for location within the channel slot of the frame parts for securement of the mirror therein, and upper and lower connectors each securing the proximate ends of the frame parts together for providing an embracing of the additional mirror, with said connectors securing the proximate inturned frame part ends together, said connectors pivotally mounting to their respective upper and lower brackets, each connector being U-shaped and cross sectioned, each connector disposed for matingly inserting over the proximate ends of each frame part, and fasteners securing the connector with the contiguous frame part ends, each connector having a centrally arranged aperture therein, and another fastener provided through said connector aperture and arranged for securing with either the proximate upper or lower disposed brackets, said upper and lower brackets including at least one aperture there through, said connector securing therein for support of an additional mirror thereto, the end of each upper and lower bracket securing with the existing external rear view mirror and frame having elongated slots, and said elongated slots disposed for facilitating the securement of said additional mirror and said frame to the existing rear view mirror and frame, a back support plate arranged along the backside of the said additional mirror and provided for protection of the additional mirror against breakage, and wherein said combined back support plate and mirror being embraced by the frame means surrounding their periphery thereof.

4,504,119

ONE-DIMENSIONAL LIQUID CRYSTAL SCANNER

Souichi Sekimoto, and Ryoki Kato, both of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Kanagawa, Japan

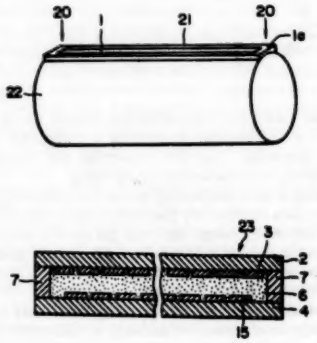
Division of Ser. No. 295,284, Aug. 24, 1981, Pat. No. 4,431,913.

This application Sep. 22, 1983, Ser. No. 534,892

Claims priority, application Japan, Dec. 4, 1980, 55-170252

Int. Cl.[3] G02F 1/13; G03B 27/72; H04N 1/06, 1/024

U.S. Cl. 350—336 2 Claims



1. A one-dimensional scanner for use as a light valve in an image reproducing device comprising:

an upper electrode having a plurality of upper electrode elements arranged at a predetermined pitch and at a predetermined spacing from each other in a one-dimensional scanning direction;

a lower electrode having a plurality of lower electrode elements arranged at a predetermined pitch and at a predetermined spacing from each other in a one-dimensional scanning direction in an opposed, spaced and staggered relation to said plurality of upper electrode elements, so that each lower electrode element is positioned across two adjacent upper electrode elements thereby defining a first picture element region between said each lower electrode element and one of said two adjacent upper electrode elements and a second picture element region between said each lower electrode element and the other of said two adjacent upper electrode elements;

a layer of material having an electro-optical effect interposed between said upper electrode and said lower electrode; and

one-dimensional scanning means adapted to select respective pairs of said upper and lower electrode elements overlapping each other sequentially in said one-dimensional scanning direction, thereby selecting picture element regions one after another in said one-dimensional scanning direction to effect one-dimensional scanning;

time serial electric signals being applied to each pair of selected upper and lower electrode elements, and said upper and lower electrodes being light-transmittable wherein uniform light is irradiated onto said layer from one of said upper and lower electrodes.

4,504,120

CERAMIC SUBSTRATE SUPPORT FOR ELECTRONIC COMPONENTS AND INTEGRATED ELECTRONIC CIRCUITS

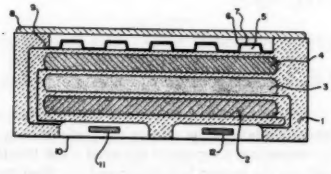
Ulrich von Alpen, Schlossborn; Stefan Schindler, and Heinrich Schelter, both of Selb, all of Fed. Rep. of Germany, assignors to Varta Batterie Aktiengesellschaft, Hannover, Fed. Rep. of Germany

Filed Jan. 31, 1983, Ser. No. 462,470

Claims priority, application Fed. Rep. of Germany, Feb. 27, 1983, 3207131

Int. Cl.³ G02F *1/01*; H01M *10/38*

U.S. Cl. 350—357 **15 Claims**



1. A ceramic housing for electronic components and integrated electronic circuits, said housing consisting of a multilayered structure of an ion-conducting solid electrolyte material having a minimum conductivity at room temperature of $\sigma = 10^{-3}\Omega^{-1}cm^{-1}$, whereby said housing is suitable as the electrolyte for a solid battery and as insulation for electronic components.

4,504,121

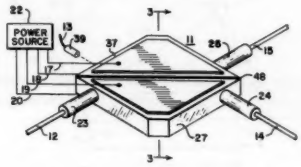
INTERFEROMETRIC MULTIMODE FIBER OPTIC SWITCH AND MODULATOR

W. John Carlsen, Boston, and Paul Melman, Newton, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Nov. 2, 1981, Ser. No. 317,362

Int. Cl.³ G02F *1/03*

U.S. Cl. 350—385 **21 Claims**



1. In combination:

first electro-optical crystal means,

second electro-optical crystal means,

a dielectric beam splitting coating affixed to portions of both of said crystal means with coated portions of both of said crystal means being juxtaposed, and

means for varying an index of refraction of one of said crystal means with respect to an index of refraction of the other of said crystal means.

4,504,122

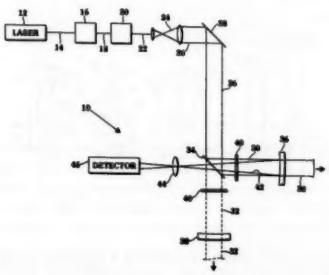
SYSTEM AND METHOD FOR TIME SHARING LASER SYSTEM WHICH ALSO GENERATES A LOCAL OSCILLATOR SIGNAL

Bruce J. Bartholomew, Poway, Calif., assignor to General Dynamics Corporation/Convair Div., San Diego, Calif.

Filed Apr. 21, 1983, Ser. No. 487,333

Int. Cl.³ G02F *1/00*; G02B *5/30*

U.S. Cl. 350—388 **21 Claims**



17. A method of generating a local oscillator signal for use in a laser system comprising:

generating a modulated laser beam having at least two polarization states;

splitting the modulated beam into a beam having a first polarization state and into a beam having a second polarization state;

redirecting a small portion of each beam back along its original axis;

mixing the redirected beams to form a single redirected beam polarized in parallel, and

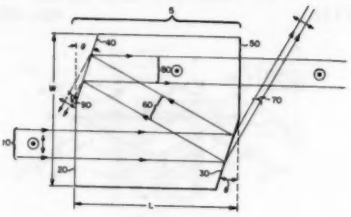
detecting the single redirected beam to provide a local oscillator signal.

4,504,123

HIGH EFFICIENCY POLARIZING BEAMSPLITTER

Irl W. Smith, Newton, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Oct. 5, 1981, Ser. No. 308,330
Int. Cl.³ G02B 27/10
U.S. Cl. 350—394 **12 Claims**



1. In combination:

means for propagating an incident electromagnetic wave through a first medium, such wave being incident on, and substantially normal to, a first surface of the first medium;

means for splitting said propagating wave into two beams, said splitting means comprising a second medium adjacent the first medium at an interface, the first medium having a refractive index greater than that of the second medium, said refractive index of the first medium being substantially the same with respect to each of the two beams,

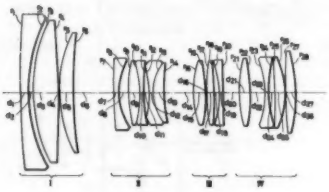
wherein said interface is substantially at the Brewster angle with respect to the direction of the propagating wave incident on such interface.

4,504,124

ZOOM LENS SYSTEM

Toshihiro Imai, and Yasuzi Ogata, both of Hachiooji, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Jan. 31, 1983, Ser. No. 462,453
Claims priority, application Japan, Feb. 10, 1982, 57-20221
Int. Cl.³ G02B 15/18
U.S. Cl. 350—427 **13 Claims**



1. A zoom lens system comprising a first lens group having positive power and having the focusing function, a second lens group having negative power and having the magnification-varying function, a third lens group having positive power and having the magnification-varying function, and a fourth lens group having positive power and having the magnification-varying function, said zoom lens system according to the present invention being arranged to fulfill the conditions (1) through (4) shown below:

(1) $1.84<f_1/f_W<2.1$
(2) $-0.53<f_2/f_W<-0.43$
(3) $1.64<\beta_2T/\beta_2W<1.94$
(4) $1.44<\beta_3T\beta_4T/\beta_3W\beta_4W<1.68$

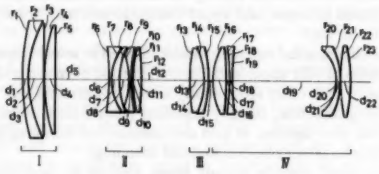
where, reference symbol f_i represents the focal length of ith lens group, reference symbol f_W represents the focal length of the lens system as a whole in the wide position, reference symbol βiW represents the magnification of ith lens group in the wide position, and reference symbol βiT represents the magnification of ith lens group in the teleposition.

4,504,125

ZOOM LENS SYSTEM

Tooru Fujii, Hino, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Nov. 4, 1982, Ser. No. 439,294
Claims priority, application Japan, Nov. 13, 1981, 56-181196
Int. Cl.³ G02B 15/18
U.S. Cl. 350—427 **5 Claims**



1. A zoom lens system comprising a first lens group having positive refractive power, a second lens group having negative refractive power, a third lens group having positive refractive power and a fourth lens group having positive refractive power, said first lens group being used for focusing, said second lens group being used for variation of magnification, said third lens group being used for compensation for the movement of image surface to be caused when the magnification is varied by the second lens group; said first lens group comprises a cemented doublet, which is formed by cementing a negative lens and a positive lens, and a positive lens; said second lens group comprises a cemented doublet, which is formed by cementing a biconcave lens and a positive meniscus lens arranged to be convex toward the object side, and a biconcave lens and a biconvex lens; said third lens group comprises a cemented doublet formed by cementing a biconvex lens and a negative meniscus lens; and said fourth lens group comprises a positive lens, a biconcave lens, a negative meniscus lens having a concave surface with a small radius of curvature and arranged to be concave toward the object side, and a biconvex lens; said zoom lens system being arranged to fulfill the following conditions (1) through (5):

(1) $0.15<|f_{II}|/f_t<0.19$
(2) $0.95<f_I/f_{III}<1$

(3) $2<f_a/|f_{II}|<3$

(4) $0.73<r_7/|f_{II}|<0.76$

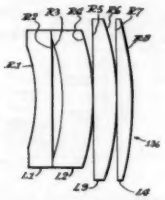
(5) $23<\nu_4-\nu_5<29$

wherein reference symbol f_t represents the focal length of the lens system as a whole in the teleposition, reference symbols f_I, f_{II} and f_{III} respectively represent the total focal lengths of the first lens group, the second lens group and the third lens group, reference symbol f_a represents the focal length of the lens component arranged on the image side in the second lens group, reference symbol r_7 represents the radius of curvature of the cemented surface of the cemented doublet arranged on the object side in the second lens group, and reference symbols ν_4 and ν_5 respectively represent Abbe's numbers of respective lens elements constituting the cemented doublet in the second lens group.

4,504,126
DIGITAL PLATE MAKER SYSTEM AND METHOD

E. Raymond Thomas; Lysle D. Cahill, both of Dayton; John L. Tibbits, Centerville, all of Ohio; Kenneth D. Fraser, Scarboro, Canada; John F. Keane, Bellbrook, Ohio; Stanley C. Harting, Kettering, Ohio; George H. Kramer, Xenia, Ohio; Ronald J. Duke, Miamisburg, Ohio; Theodore A. Kessis, Dayton, Ohio; John C. Butler; Gary L. Frank, both of Centerville, Ohio, and John A. Lawson, Dayton, Ohio, assignors to Coulter Systems Corporation, Bedford, Mass.

Division of Ser. No. 139,462, Apr. 11, 1980, Pat. No. 4,408,868.
This application Oct. 4, 1983, Ser. No. 538,969
Int. Cl.³ G02B 9/34
U.S. Cl. 350—469 2 Claims



1. A field flattening lens system for use in an optical imaging system, said system including a raster mirror, oscillating from side to side around a vertical axis, an elongate member to be imaged, said member being imaged along a horizontal image line which is spaced from said vertical axis, and a focused beam of light traveling along an optical path approaching said raster mirror in a straight line and leaving said raster mirror along a straight line that is swept from side to side in a plane by oscillation of said raster mirror, said plane including said horizontal image line, said lens system comprising:

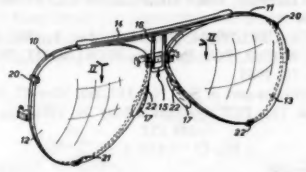
a plurality of lens components arranged between said raster mirror and said member with said optical path passing therethrough, the lens components including from the object to the image end a first negative component having a concave object side surface, a second positive component having a concave object side surface, a third positive component having a substantially flat object side surface and a fourth component having a flat object side surface, the lens components providing unitary magnification and maintaining said beam in focus at said image line along said elongate member as said optical path leaving said raster mirror is swept from side to side, each component being made from a material having a low index of refraction.

4,504,127
FRAME FRONT FOR EYEGLASSES PERMITTING INTERCHANGEABILITY OF LENSES

Jackie Cottet, Morez, France, assignor to Cottet Freres, Morez, France

Filed Mar. 9, 1982, Ser. No. 356,441
Claims priority, application France, Apr. 14, 1981, 81 07453
Int. Cl.³ G02C 1/00, 1/04, 5/06
U.S. Cl. 351—86 12 Claims

1. A frame front for eyeglasses or spectacles, comprising two lens supports, a main bridge member inter-connecting said lens supports, a median bridge member carried by said main bridge member extending between said lens supports, a plurality of protruding prongs provided on said lens supports for receiving lenses, said median bridge member being disconnected from said lens supports, two retaining notches being provided on said median bridge member, said lens supports being freely received in said retaining notches respectively, said lens supports being resiliently mounted on said main bridge member

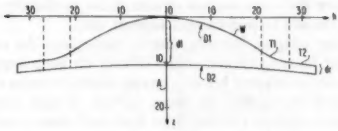


for displacement relative to said median bridge member to a lens mounting or removal position.

4,504,128
SPECTACLE LENS WITH HIGH POSITIVE REFRACTIVE POWER

Günther Guilino, Munich; Rudolf Barth, Höhenkirchen, and Werner Köppen, Gröbenzell, all of Fed. Rep. of Germany, assignors to Optische Werke G. Rodenstock, Munich, Fed. Rep. of Germany

Filed Jul. 8, 1982, Ser. No. 396,406
Claims priority, application Fed. Rep. of Germany, Jul. 8, 1981, 3126967; Jul. 8, 1981, 3126997; Mar. 31, 1982, 3211997; Mar. 31, 1982, 3211998
Int. Cl.³ G02B 3/02; G02C 7/02
U.S. Cl. 351—167 16 Claims



1. A spectacle lens with high positive refracting power comprising a convex rotationally symmetric front surface, said front surface having an aspheric effective part, an adjacent transition zone, and a boundary zone, said lens having a concave rear surface forming together with the boundary zone a supporting edge, said lens being constructed so that a sagitta z of a point on the effective part from the vertex of the front surface in the direction of the optical axis is given by the equation:

$$z = \frac{Ch^2}{1 + \sqrt{1 - (K+1)C^2h^2}} + \sum_{i=3}^{6} I_i h^i$$

where h is the distance of this point from optical axis; C is determined by the desired refracting power of the front surface at the vertex; and K, I_3, I_4, I_5, and I_6 are aspheric coefficients so determined that $|\Delta R| + |\Delta S|$ is a minimum over the entire range of the visual angle, where ΔR is the refracting power error, and ΔS is the astigmatism, and where $\Delta S = T - S$ and $\Delta R = (S+T)/2$, T being the tangential refracting power error and S being the sagittal refracting power error.

4,504,129

PHOTOGRAPHY ADAPTOR ASSEMBLY FOR A SLIT LAMP EXAMINATION UNIT

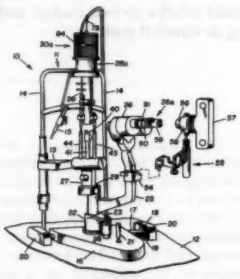
Richard Van Iderstine, 10806 Stone Canyon Rd., #2118, Dallas, Tex. 75230

PCT No. PCT/US81/00694, § 371 Date Jan. 8, 1982, § 102(e) Date Jan. 8, 1982, PCT Pub. No. WO81/03417, PCT Pub. Date Dec. 10, 1981

Continuation-in-part of Ser. No. 153,209, May 27, 1980, abandoned. This PCT application May 26, 1981, Ser. No. 351,672

Int. Cl.³ A61B *3/14*

U.S. Cl. 351—206 **23 Claims**



1. An assembly for converting a commercially-available slit lamp optical examination apparatus of the type having a microscope and an illumination column into an optical examination apparatus capable of taking photographs of the eye through at least one ocular of said microscope, said assembly comprising:

a sleeve adapted to be connected into the lens opening of a camera;

a clamp adapted to be secured onto the support for the microscope of said slit lamp apparatus;

a camera support arm adapted to be pivotably connected to said clamp, said arm having a means thereon adapted to receive the outer surface of said sleeve to thereby attach said camera to said camera support arm;

an ocular adaptor housing adapted to replace the original ocular housing of said ocular of said slit lamp apparatus, said ocular adaptor housing having a smooth outer surface adapted to receive the inner surface of said sleeve to thereby exclude external light from said sleeve; and

an illumination means adapted to replace the original light source on said illumination column of said slit lamp apparatus, said illumination source comprising:

a housing adapted to be connected onto said illumination column of said slit lamp apparatus;

a steady light means in said housing for supplying the illumination necessary for a routine examination; and

a strobe light means in said housing for supplying the illumination necessary for taking photographs through said ocular.

4,504,130

SYSTEM FOR RECORDING A TIME CODE SIGNAL ON MOTION PICTURE FILM

Steven A. Bell, Venice, and Ivan T. Kruglak, Sylmar, both of Calif., assignors to Coherent Communications, Inc., Sylmar, Calif.

Filed Sep. 27, 1982, Ser. No. 424,841

Int. Cl.³ G03B *17/24*

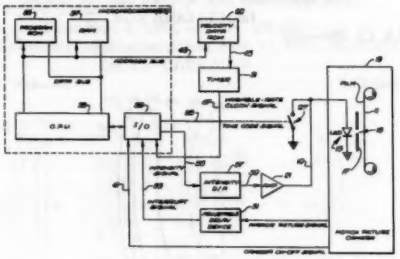
U.S. Cl. 352—92 **31 Claims**

1. Apparatus for recording a time code signal on film while it is being intermittently advanced by a motion picture camera, each intermittent film advancement following a variable velocity profile, the apparatus comprising:

transducer means disposed adjacent the film;

signal generating means for coupling a time code signal to the transducer means, to record the signal on the film as the motion picture camera advances the film past the transducer means; and

timing means for producing a timing signal indicative of the instantaneous velocity of the film relative to the transducer means, as the film is advanced intermittently past the transducer means;



wherein the signal generating means includes time base adjustment means, responsive to the timing signal, for adjusting the time base of the time code signal coupled to the transducer means, to compensate for the variable velocity profile of the film such that the time code signal is recorded on the film with a substantially constant time base.

4,504,131

CAMERA

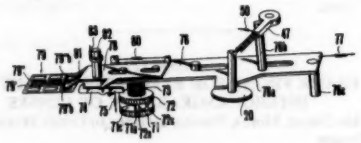
Hiroyuki Kimura, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 8, 1982, Ser. No. 347,048

Claims priority, application Japan, Feb. 13, 1981, 56-19608; Feb. 24, 1981, 56-25851; Feb. 24, 1981, 56-25852; Feb. 24, 1981, 56-25853; Feb. 24, 1981, 56-25854; Feb. 25, 1981, 56-26608; Feb. 26, 1981, 56-27299; Feb. 26, 1981, 56-27300; Feb. 26, 1981, 56-27301; Feb. 27, 1981, 56-28173; Feb. 27, 1981, 56-28174; Mar. 5, 1981, 56-31521; Mar. 5, 1981, 56-31522; Mar. 5, 1981, 56-31523; Mar. 5, 1981, 56-31524; Mar. 11, 1981, 56-34898; Mar. 11, 1981, 56-34899

Int. Cl.³ G03B *1/12*

U.S. Cl. 354—173.1 **23 Claims**



1. A camera in which a film is continuously wound from the shaft of a film magazine loaded in the camera onto a spool in the camera, and then exposed frame by frame as the film is rewound into the magazine, said camera being operable with a direct power supply and comprising:

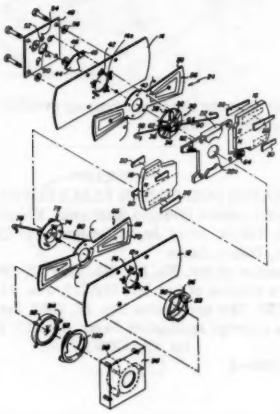
motor means to drive the spool and the magazine shaft on the basis of the direction of the power supply, and

a detection means to detect a loading of the magazine and to change the direction of the power supply to the motor from a direction for driving of the magazine shaft to a direction for driving of the spool.

4,504,132
MULTIFUNCTION ELECTROMAGNETIC ACTUATOR AND CAMERA CONTROL APPARATUS EMLOYING SAME

William A. Martin, Fairport, and James K. Lee, Pittsford, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 2, 1983, Ser. No. 463,105
Int. Cl.³ G03B 3/10, 9/08
U.S. Cl. 354—195.1 6 Claims



1. In combination with a camera, a dual function electromagnetic actuator, comprising:

a permanent magnet having two opposite generally parallel sides, magnetized in a direction generally perpendicular to the sides;

a first plate of mild steel position with respect to one of said sides to form a first magnetic gap;

a first armature comprising a planar coil carried by a sheet of insulating material, and mounted for movement in said magnetic gap, and mechanically coupled to a first camera element to actuate said first camera element;

a second plate of mild steel spaced away from the opposite side of said magnet to define a second magnetic gap; and

a second armature comprising a planar conductive coil carried by a sheet of flexible insulating material, and mounted for movement in said second magnetic gap, and mechanically coupled to a second camera element.

4,504,133
POWER SOURCE SWITCH FOR CAMERAS

Masaaki Nakai, Nara; Yasuzi Kogure, Hyogo; Masayoshi Sahara, and Toshio Kobori, both of Osaka, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Azuchi, Japan

Filed Sep. 11, 1978, Ser. No. 941,507
Claims priority, application Japan, Sep. 13, 1977, 52-109503
The portion of the term of this patent subsequent to Apr. 22, 1997, has been disclaimed.
Int. Cl.³ G03B 17/38
U.S. Cl. 354—266 21 Claims

1. A camera comprising:

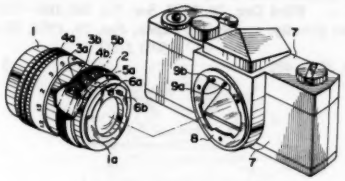
an adjusting member manually rotatable for adjusting a photographing parameter of the camera and having a circumferential surface engagable by a photographer's finger for rotation thereof;

an electrically energizable indicating system for indicating information relating to the photographing parameter adjusted by said adjusting member;

a power source for supplying energizing current to said indicating system;

finger touch sensing means provided on around said circumferential surface engagable by the photographer's finger from any direction, said finger touch sensing means including a first and second contacting portions electrically insulated from each other; and

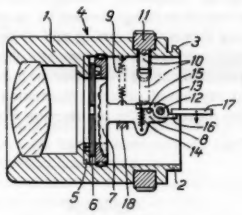
a switching circuit for connecting said power source to said indicating system for controlling the current to said indicating system, said switching circuit including two terminals which are connected to said first and second contacting portions, respectively, said switching circuit being normally maintained in an open condition interrupting the current to said indicating system and being actuated in response to a conductor body such as a hand touching both said first and second contacting portions to increase the conductivity therebetween, thereby feeding energizing current to said indicating system.



4,504,134
PHOTOGRAPHIC OBJECTIVE WITH AUTOMATIC DIAPHRAGM

Werner Schlapp, Asslar, and Werner Wiessner, Wetzlar, both of Fed. Rep. of Germany, assignors to Ernst Leitz Wetzlar GmbH, Wetzlar, Fed. Rep. of Germany

Filed Oct. 4, 1983, Ser. No. 538,967
Claims priority, application Fed. Rep. of Germany, Oct. 6, 1982, 3236958
Int. Cl.³ G03B 9/07
U.S. Cl. 354—272 6 Claims



1. Photographic objective for a single-lens mirror reflex camera having a reflex mirror and a diaphragm control lever for transmitting force from said reflex mirror to said objective, said objective comprising:

a diaphragm preset system;

an automatic diaphragm comprising:

iris blades;

a spacially fixed leaf support ring supporting said iris blades; and

a leaf guide ring rotatable relative to the leaf support ring, said automatic diaphragm being adapted to open to its largest possible value after a picture is taken in response to motion of the reflex mirror transmitted through said diaphragm control lever; and

means connected to said leaf guide ring for compensating for an advance of said diaphragm control lever whereby after said diaphragm control lever has moved sufficiently to cause said automatic diaphragm to open to its largest

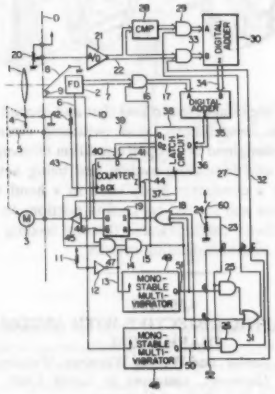
possible value, further motion of said diaphragm control lever does not affect said automatic diaphragm.

4,504,135

AUTOMATIC FOCUSING DEVICE

Takashi Kawabata, Kamakura, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 28, 1983, Ser. No. 566,164
Claims priority, application Japan, Jan. 10, 1983, 58-2398
Int. Cl.³ G03B *3/00*
U.S. Cl. 354—402 **7 Claims**



1. An automatic focusing device comprising:

(a) focus detection means for producing information representing a focusing state of an object lens;

(b) correction means for producing information representing a difference between a focus point of an image formed by a visible ray transmitted through said object lens and a focus point of an image formed by an infrared ray; and

(c) focusing means for focusing said object lens, said focusing means selectively moving said object lens to an in-focus point for the visible ray or an in-focus point for the infrared ray based on the information from said focus detection means and the information from said correction means.

4,504,136

MAGNETIC DEVELOPING DEVICE WITH OFFSET MAGNETIC POLE

Masao Yoshikawa, Naka; Fumitaka Kan, Tokyo, and Hiroshi Satomura, Hatogaya, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 13, 1983, Ser. No. 484,699
Claims priority, application Japan, Apr. 24, 1982, 57-68950
Int. Cl.³ G03G *15/09*
U.S. Cl. 355—3 DD **3 Claims**

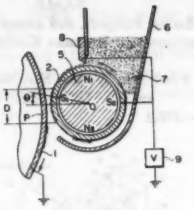
1. A developing device for developing a latent image on an image bearing member, comprising:

a developer carrying member disposed in opposed relationship with an image bearing member and movable toward a developing area;

means for supplying one-component magnetic developer to said developer carrying member; and

a developing magnetic pole disposed inside said developer carrying member and facing the developing area;

wherein said developing magnetic pole is disposed at a position deviated by an angle θ in the range of 5°–15° toward the upstream side with respect to the direction of movement of said developer carrying member from the nearest



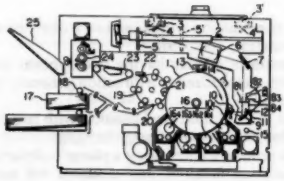
point between the image bearing member and said developer carrying member.

4,504,137

APPARATUS FOR COLOR ELECTROPHOTOGRAPHY

Takao Aoki, Abiko; Hidejiro Kadowaki, Yokohama, and Naoki Iwami, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 149,431, May 13, 1980, abandoned, which is a division of Ser. No. 914,729, Jun. 12, 1978, Pat. No. 4,230,783. This application Sep. 28, 1982, Ser. No. 426,080
Claims priority, application Japan, Jun. 17, 1977, 52-71901
Int. Cl.³ G03G *15/01*
U.S. Cl. 355—4 **15 Claims**



5. An electrophotographic apparatus including a plurality of developing units for developers of different colors, respectively, comprising:

a photosensitive member mainly consisting of an insulating layer, a photoconductive layer and a conductive layer;

means for exposing at least a portion of said photosensitive member to light images of predetermined color components; and

means for uniformly exposing said portion of said photosensitive member to near infrared light, substantially simultaneously with the exposure of said portion by said light image exposure means, wherein said uniform exposure light is mainly in a long wavelength range which is outside the wavelength range to which said photosensitive member is principally sensitive.

4,504,138

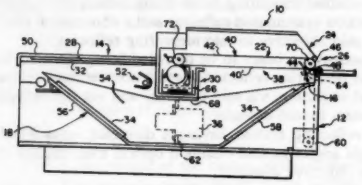
METHOD AND APPARATUS FOR DEVELOPING ELECTROSTATIC LATENT IMAGES

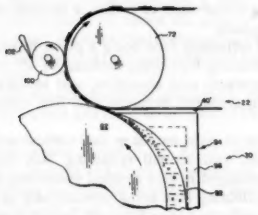
Manfred R. Kuehnle, New London, N.H.; Josef Matkan, Malvern, Australia, and Kenneth D. Fraser, Scarboro, Canada, assignors to Coulter Systems Corporation, Bedford, Mass.

Filed Oct. 27, 1981, Ser. No. 315,542
Int. Cl.³ G03G *15/10*
U.S. Cl. 355—10 **29 Claims**

1. A method of developing a latent electrostatic charge image carried on the photoconductive surface of an electrophotographic member by liquid toner comprising the steps of forming a thin viscous highly dense layer of electroscopic

toner particles on a carrier therefor, defining a virtual displacement between said carrier and said photoconductive surface, presenting to said member along a uniform area thereof at said virtual displacement said thin viscous highly dense layer of electroscopic toner particles and transferring only latent image





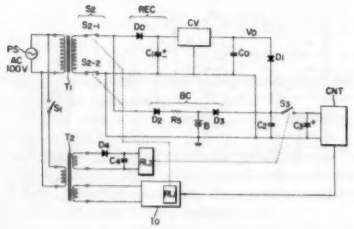
developing portions of said layer to the photoconductive member by impressing the carrier onto the photoconductive surface at said virtual displacement with the said layer therebetween, wherein said latent image is developed at said virtual displacement.

4,504,139

COPYING APPARATUS

Hiromi Nozaki, and Eiichi Yoshida, both of Hachioji, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Oct. 5, 1982, Ser. No. 432,838
Claims priority, application Japan, Oct. 18, 1981, 56-166896
Int. Cl.³ G03G *15/00*
U.S. Cl. 355—14 R **2 Claims**



1. A power device for a copying apparatus of the type having a control circuit for controlling a copying operation and an AC power source for powering the copying operation, comprising a DC power circuit including a storage battery for providing a DC power source to the control circuit, and a first switch for connecting the DC power circuit to the AC power source at times other than during a copying operation and disconnecting the DC power circuit and storage battery from said AC power source upon initiation of a copying operation so that the control circuit is driven only by power fed from the storage battery.

4,504,140

CAMERA FILTER HOLDERS

Nilo R. Filidei, 201 Remsen Ave., Avenel, N.J. 07001

Filed Jan. 23, 1979, Ser. No. 5,838
Int. Cl.³ G03B *27/72*
U.S. Cl. 355—71 **1 Claim**

1. Filter holders for square filters fabricated in one, solid piece measuring the width of a square filter, with circular opening the size of a copy camera lens to be used on, with a tight fitting slot substantially cut through the height of said holders, whereby the remaining un-slotted area at the top to act as a top closure and stop for mounted square filters to be inserted and held in place by the tightness of the slot, said slot to be positioned at approximately one quarter the thickness of said holders from front to back thereby allowing the remaining three quarters of the total thickness of said holders for a means to grasp the lens collar, and the mounted square filters themselves when inserted into said holders act as final positioning in front of lens, by slightly pushing said holders against the front of the lens collar rim.

4,504,141

SYSTEM FOR MAKING MATCHED BACKGROUNDS

Noby Yamakoshi, 1133 S. Wabash Ave., Chicago, Ill. 60605

Filed Jul. 7, 1983, Ser. No. 511,571
Int. Cl.³ G03B *27/32*; G03F *3/08*
U.S. Cl. 355—77 **4 Claims**

1. Method for making matched backgrounds for images of objects, said backgrounds having continuously varied gradations of tone, said method comprising:

(a) positioning a continuous tone step tablet negative on a scanning drum of a laser scanning device,

(b) positioning a piece of lithographic film on a receiving drum of the laser scanning device,

(c) positioning a first photo mechanical screen over said piece of film,

(d) transfer scanning an image of said continuous tone step tablet negative to the piece of film through the screen while enlarging from 225% to 1800% of original size, and

(e) repeating steps (b)–(d) using differing screen angles for producing sufficient plates for desired color combination, and

(f) developing the pieces of film treated in steps (b)–(e).

4,504,142

PHOTOGRAPHY PRINTING FRAME

Chester L. Richards, Sr., 1610 Sheridan Rd., Glendale, Calif. 91206

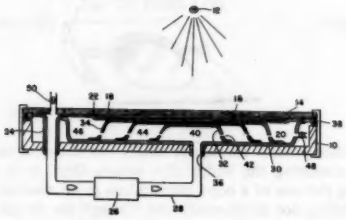
Filed Sep. 26, 1983, Ser. No. 535,429
Int. Cl.³ G03B *27/20*
U.S. Cl. 355—92 **15 Claims**

1. For use with a photographic printing frame, apparatus for

enhancing the contact between a mask and a photosensitive sheet in the vacuum environment existing between a transparent plate and a flexible, fluid impervious membrane of the printing frame, comprising in combination:

(a) a backing plate, substantially parallel to the transparent plate;

(b) a pressurizable bladder, having a series of interconnected chambers arranged in a predetermined spatial alignment, to be positioned betweeen said plate and the transparent plate;



(c) means for sequentially inflating said bladder chambers for applying a force pressing the photosensitive sheet against the mask and the transparent plate in a predetermined spatial pattern,

whereby any air trapped between the mask and the photosensitive sheet can be forced out into the vacuum environment, thereby improving the contact between the mask and the photosensitive sheet.

4,504,143

OPTICAL ARRANGEMENT FOR AN OPTO-ELECTRONIC RANGE-FINDER

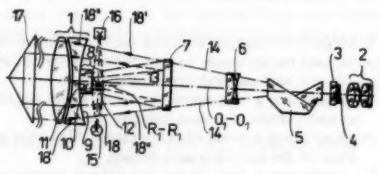
Rudi Heinze; Rolf Röder, and Wieland Feist, all of Jena, German Democratic Rep., assignors to Jenoptik Jena G.m.b.H., Jena, German Democratic Rep.

Filed Jun. 23, 1982, Ser. No. 387,688

Claims priority, application German Democratic Rep., Jul. 1, 1981, 231365

Int. Cl.³ G01C *3/08*; G02B *23/04*

U.S. Cl. 356—5 **4 Claims**



1. An optical arrangement for an opto-electronic range-finder comprising in optical alignment,

an objective,

a reflecting system,

a reflector,

a sender for emitting a measuring beam,

a measuring reflector, for reflecting said emitted measuring beam, said emitted measuring beam being the measuring beam to be detected after reflection,

a detector for detecting said measuring beam to be detected,

said objective having a front face in spaced opposition to said measuring reflector, and a rear face in opposition to said reflector,

said measuring reflector, said objective and said reflector having a common optical axis,

said reflecting system being cemented to a near-axial portion of said rear face,

and being for obscuring said near axial-portion of said objective,

said detector and said sender being arranged at right angles to said common optical axis laterally to and between said objective and said reflector,

said detector and said sender being in opposition to one another,

said emitted measuring beam being directed via said reflection system, said reflector and a non-central portion of said objective to said measuring reflector,

said measuring beam to be detected being directed from said measuring reflector via said non-central portion of said objective, via said reflector and via the reflection system to said detector,

said reflecting system having a diameter, considered at right angles to said common optical axis, smaller than the objective diameter,

said reflecting system being arranged between said objective and said reflector and having an optical axis in spaced and parallel relation to said common optical axis and being constituted of a first, a second, and a third reflecting face,

said second reflecting face being a plane reflector,

said first reflecting face being inclined by 45° to said optical axis towards said objective, said second reflecting face being arranged between said first reflecting face and

said rear face at right angles to said optical axis,

said first and said second reflecting face being subsequently arranged in said emitted measuring beam,

said third reflecting face being substantially in parallel to said first reflecting face arranged between said reflecting face and said reflector,

said third reflecting face being arranged in said measuring beam to be detected,

a projection of said first reflecting face onto said second reflecting face being smaller than said second reflecting face.

4,504,144

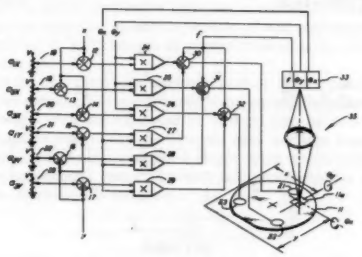
SIMPLE ELECTROMECHANICAL TILT AND FOCUS DEVICE

David Trost, Fairfield, Conn., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Jul. 6, 1982, Ser. No. 395,414

Int. Cl.³ G03B *27/42*

U.S. Cl. 356—150 **5 Claims**



1. An apparatus for correcting tilt and focus errors in a mask projection system for a plurality of subfields on a wafer which vary in position about the surface of the wafer according to a predetermined scheme, comprising in combination:

table means for supporting a wafer and movable about the X and Y axis and in the Z direction;

first, second and third servo motors;

each of said servo motors having actuators fixed to said table means;

first means for providing signals proportional to deviation of

each wafer subfield in the Z direction and about the X and Y axes from a predetermined focal plane;

second means providing signals representative of the X and Y coordinates of the center of each subfield;

third means providing signals representative of the X and Y coordinates of the actuators of each of said three servo motors relative to a reference point;

analog circuit means connected to said first, second, and third means for solving the equations;

$$Z_1=(X-a_{1x})\theta y+(Y-a_{1y})\theta x+f$$

$$Z_2=(X-a_{2x})\theta y+(Y-a_{2y})\theta x+f$$

$$Z_3=(Y-a_{3x})\theta y+(Y-a_{3y})\theta x+f$$

wherein:

X is the X coordinate of the center of the subfield,

Y is the Y coordinate of the center of the subfield,

f is deviation of the wafer table means form the predetermined focal plane,

θx is the deviation in tilt about the X axis,

θy is the deviation in tilt about the axis,

a_{1x}, a_{2x}, a_{3x} are the respected distances in the X direction of the first, second and third servo motors from the reference point, and

a_{1y}, a_{2y}, a_{3y} are the respected distances in the Y direction of the first, second and third servo motors from the reference point,

said circuit means applying the Z_1, Z_2 and Z_3 solutions to said first, second and third servo motors for causing said actuators to correct the deviations of said wafer from said predetermined focal plane.

4,504,145

APPARATUS CAPABLE OF MEASUREMENT OF PROFILE OF EMISSION LINE SPECTRUM

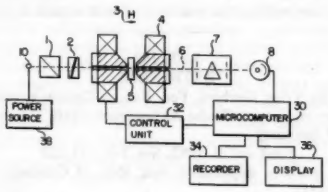
Hideaki Koizumi, Tokyo, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 25, 1982, Ser. No. 411,370

Claims priority, application Japan, Aug. 28, 1981, 56-134167

Int. Cl.³ G01J *3/00*

U.S. Cl. 356—300 **9 Claims**



1. An apparatus capable of measuring the profile of an emission line spectrum comprising:

light emitting means for emitting a line spectrum whose profile is to be measured;

magnetic field establishing means for establishing a variable-intensity magnetic field on an optical path extending from said light emitting neans, the direction of said magnetic field being parallel to said optical path;

polarizing means for selectively transmitting linearly polarized light disposed between said light emitting means and said magnetic field establishing means;

means for varying the phase of said linearly polarized light disposed between said polarizing means and said magnetic field establishing means;

absorption line producing means disposed in said magnetic field, said absorption line producing means including means for enclosing an element producing an absorption line of the wavelength substantially the same as that of the emission line and maintained at a predetermined atomic vapor pressure, the width of said absorption line in wavelength being smaller than that of said emission line spectrum;

means for shifting the wavelength of a component split from said absorption line by varying the intensity of said magnetic field while the light from said light emitting means is being directed toward said absorption line producing means, and scanning said wavelength-shifted component along the wavelength of the profile of said emission line spectrum;

detecting means responsive to said waveform shifting means for detecting the light transmitted through said absorption line producing means; and

monochromatic means disposed between said absorption line producing means and said detecting means.

4,504,146

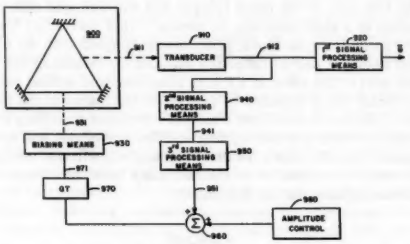
RING LASER GYRO SYSTEM

Avery A. Morgan, St. Petersburg, Fla., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jul. 6, 1981, Ser. No. 280,770

Int. Cl.³ G01C *19/64*

U.S. Cl. 356—350 **45 Claims**



1. In an angular rate sensor of the class wherein two waves travel in opposite directions, each wave substantially traveling about a closed-loop path, wherein the frequency of each of said waves is a function of the rate of rotation of said closed-loop path and there being a phase relationship established between said waves also being a function of the rate of rotation of said closed-loop path, and wherein said sensor generates a first sensor signal related to the true angular rotation of said sensor but which includes lock-in error inherent in said sensor, the improvement comprising:

sensing means responsive to at least one of said waves for providing at least a first output signal which is indicative of said phase relationship;

phase angle determining means responsive to said sensing means first output signal for determining a phase angle value, ψ, corresponding to said phase relationship between said waves at each of selected occurrences of selected first time derivative values, $d\psi/dt$, of said phase relationship;

biasing means, having an input means adapted to receive a bias control signal, for introducing a varying frequency bias in at least one of said waves resulting in a rate of change of said phase relationship to pass through zero at least once, said biasing means including means for affecting at least one of said waves so as to direct said phase relationship to some extent in response to said bias control signal; and

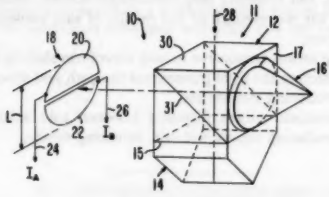
bias control signal generating means for generating said bias control signal as a function of a plurality of selected ones of said phase angle values at past occurrences of said selected first time derivative values of said phase relationship.

4,504,147

ANGULAR ALIGNMENT SENSOR

Cheng-Chung Huang, 1610 Eagle Dr., Sunnyvale, Calif. 94087

Filed Jul. 28, 1981, Ser. No. 287,676
Int. Cl.³ G01B *9/02*
U.S. Cl. 356—363 **20 Claims**



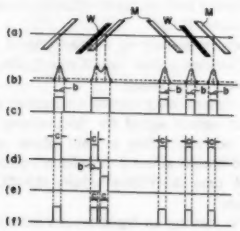
1. An angular alignment sensor comprising: a shearing interferometer block having a reference plane toward which an incoming radiation beam is directed, the block having reflecting means therein for reflecting a first part of the beam in one direction and for allowing a second part of the beam to be transmitted in a second direction transverse to the first direction; corner cube means coupled with the block for reflecting the first part of the beam toward and through said reflecting means in a third direction to present a first wavefront travelling away from the block; prism means coupled with the block and having a pair of reflecting surfaces for reflecting the second part of the beam in a fourth direction, said second part of the beam being reflected by said reflecting means of the block in a fifth direction to form a second wavefront travelling away from the block and overlapping said first wavefront; and means spaced from the block for detecting said wavefronts, whereby the angle of incidence of the incoming beam relative to the reference plane can be determined.

4,504,148

SYSTEM FOR DETECTING A SIGNAL FOR ALIGNING TWO BODIES AND SIGNAL PROCESSING METHOD

Yoichi Kuroki; Yukihiro Yoshinari, both of Kawasaki, and Ryozo Hiraga, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 22, 1982, Ser. No. 435,959
Claims priority, application Japan, Oct. 28, 1981, 56-172456
Int. Cl.³ G01N *21/30*
U.S. Cl. 356—401 **8 Claims**



1. A signal detecting system to be used with a first body provided with at least one first alignment mark and a second body provided with a plurality of second alignment marks, said system comprising:

detector means for detecting said first and second alignment marks and for putting out detection signals representative thereof;

means for producing a comparison signal; and

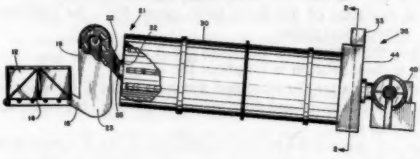
signal producing means for comparing the pulse width of said comparison signal with the pulse width of each of said detection signals and producing a plurality of substitute signals when the pulse width of any one of said detection signal is greater than the pulse width of said comparison signal.

4,504,149

CLOSED END DRUM ASPHALTIC CONCRETE RECYCLE APPARATUS AND METHOD

Robert L. Mendehall, 1770 Industrial Rd., Las Vegas, Nev. 89102

Continuation-in-part of Ser. No. 871,351, Jan. 23, 1978, Pat. No. 4,208,131, and a continuation-in-part of Ser. No. 906,734, May 17, 1978, Pat. No. 4,240,754. This application Apr. 14, 1980, Ser. No. 139,709
Int. Cl.³ B28C *5/20*
U.S. Cl. 366—4 **4 Claims**



1. A process for treating asphaltic concrete particles comprising:

directing said particles into a first end of an elongated rotating drum through a first port;

introducing hot gases of combustion into a second port, open to atmosphere, at a second, opposite end of said drum;

heating said particles to a temperature at which asphalt volatiles are given off;

burning said asphalt volatiles with said hot gases of combustion and venting substantially all of the gaseous products into atmosphere through said second port at said second drum end simultaneously with introduction of hot gases therethrough;,

continuing to heat said particles to a temperature above about 225° F.; and

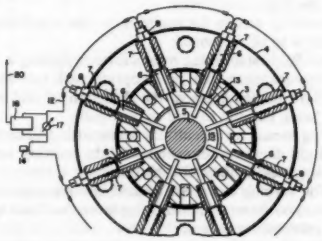
recovering said heated particles at said second drum end.

4,504,150

EXTRUDER

Gerhard De Vries, Garbsen, Fed. Rep. of Germany, assignor to Continental Gummi-Werke Aktiengesellschaft, Hanover, Fed. Rep. of Germany

Filed Jul. 6, 1983, Ser. No. 511,320
Claims priority, application Fed. Rep. of Germany, Jul. 8, 1982, 3225512
Int. Cl.³ B29B *1/06*
U.S. Cl. 366—80 **10 Claims**



1. In an extruder for kneading and extruding rubber and synthetic material mixtures; said extruder having an entry region; a cylindrical housing, which includes a housing wall and a housing interior; a screw, which is rotatably mounted in

said housing and is provided with recesses; the improvement in combination therewith which comprises:

pin bodies inserted in said wall of said housing and said pin bodies having at least a first end portion which projects freely into said interior of said housing between said recesses of said screws;

an electrical monitoring circuit arranged externally of said housing; and

a respective insert provided at least for those pin bodies associated with the entry region of said extruder, said inserts being incorporated into said monitoring circuit, being insulated relative to said pin bodies, and said inserts comprising a conductor material of which the electrical resistance varies as a consequence of deformations thereof.

4,504,151

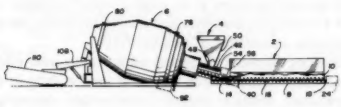
APPARATUS FOR THE TREATMENT OF WASTE SLUDGE

Walter W. Tomyn, Troy, Mich., assignor to Michigan Disposal, Inc., Dearborn, Mich.

Continuation-in-part of Ser. No. 264,266, May 18, 1981, abandoned. This application Sep. 9, 1983, Ser. No. 530,697

Int. Cl.³ B01F *9/06, 15/02*

U.S. Cl. 366—156 **11 Claims**



1. Apparatus for the treatment of waste sludge to cause its solidification and render it suitable for use as landfill by admixture of chemicals therewith, said apparatus comprising:

an elongated mixing chamber which is rotatable about its longitudinal axis and which has an opening at one longitudinal end thereof to provide entrance for the sludge and the chemicals to be mixed and an opening at the other longitudinal end thereof for exit of the sludge and chemicals after they are mixed, said mixing chamber having a generally cylindrical center portion, a generally frusto conical end portion at said one end thereof tapering from said center portion toward said first-mentioned opening and a generally frusto conical portion at said other end thereof tapering from said center portion toward said second-mentioned opening, said mixing chamber being oriented with its longitudinal axis canted upwardly from said first-mentioned opening to said second-mentioned opening at an angle from about 10° to 20° to the horizontal and said mixing chamber having inwardly extending elongated generally helical shaped mixing blades fixedly secured to its inner walls of said cylindrical and frusto conical portions whereby as the chamber is rotated about its longitudinal axis the sludge and chemicals therein are mixed and caused to move upwardly and longitudinally of the chamber from said first-mentioned opening to and then out of said second-mentioned opening;

drive means for rotating said mixing chamber about its longitudinal axis;

control means for said drive means to thereby control the rate of rotation of said mixing chamber;

a sludge hopper for reception of the sludge to be treated, said sludge hopper having an opening at the bottom thereof;

a conduit communicating at one end thereof with said opening in said hopper and at the other end thereof with said first-mentioned opening of said mixing chamber, said conduit having an auger therein;

drive means for rotating said auger to move sludge from said hopper through said conduit and into said mixing chamber;

a chemical hopper for reception of the chemicals to be mixed with the sludge, said hopper having an opening at the bottom thereof;

a conduit communicating at one end thereof with said opening in said chemical hopper and at the other end thereof with said first-mentioned opening of said mixing chamber, said second-mentioned conduit having an auger therein;

drive means for rotating said second-mentioned auger to move chemicals from said chemical hopper through said second mentioned conduit and into said mixing chamber;

control means for each of said drive means for said first-mentioned and second-mentioned augers to thereby control the respective rates of rotation of said first-mentioned and second-mentioned augers and control of the respective rates at which the sludge and chemicals are fed into said first-mentioned opening of said mixing chamber, said sludge hopper having a trough as a bottom wall and side walls which are tapered downwardly and inwardly towards said trough, said trough having an extension which extends to the exterior of said hopper, said opening at the bottom of said sludge hopper being at the location where said trough extends to the exterior of said sludge hopper; there being an auger in said trough for moving sludge in the sludge hopper through said opening and into the extension of said trough; said extension of said trough having an opening which communicates with said first-mentioned conduit, said apparatus including valve means disposed between said chemical hopper and said second-mentioned conduit communicating with said chemical hopper and said first-mentioned opening for controlling the feed rate of the chemical fed from said chemical hopper to said second-mentioned auger, said valve means including a rotatable paddle wheel valve for delivering the chemicals to said second-mentioned auger at an adjustable rate, and said chemical hopper including a chemical hopper frame for containing and transporting the chemical independently of the remainder of said apparatus, said frame including a container portion for containing the chemical and adapter means for connecting said container to said second-mentioned conduit for delivery of the chemical from said container to said second-mentioned conduit.

4,504,152

MIXING AND/OR KNEADING APPARATUS

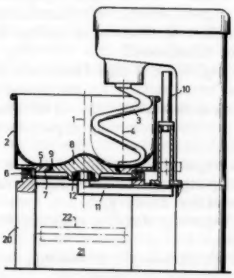
Dieter Möller, Osnabrueck, and Konrad Böert, Wallenhorst, both of Fed. Rep. of Germany, assignors to Dierks & Söhne GmbH & Co. KG, Osnabrueck, Fed. Rep. of Germany

Filed May 13, 1981, Ser. No. 263,338

Claims priority, application Fed. Rep. of Germany, May 28, 1980, 3020167

Int. Cl.³ B01F *15/02*

U.S. Cl. 366—188 **16 Claims**



1. A mixing and/or kneading machine for dough, foodstuff, or the like comprising a vat, support means for rotatably supporting said vat for rotation about a vertical axis, said vat

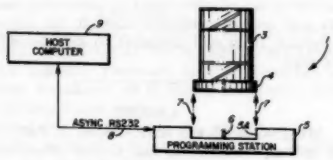
having a bottom with an aperture therein, a closure-bearing means for said aperture, said closure-bearing means comprising a closure member and a bearing rotatably supporting said closure member, and operable means for moving said closure-bearing means between a closed position in which said closure member closes said aperture and an open position in which said closure-bearing means is displaced from a position underlying said aperture such that the contents of said vat are free to exit vertically downwardly from said aperture, said operable means comprising a bracket member underlying said vat and mounting said bearing means on which said closure member is rotatably mounted, said bearing means having an axis of rotation coincident with the axis of rotation of said vat, said operable means further comprising a drive means for sequentially operating said bracket member to initially move said bracket member and said closure-bearing means downwardly while precluding pivotal movement and then to subsequently pivot said bracket member and said closure-bearing means about a vertical axis to its open position displaced from a position underlying such aperture such that said bracket member and said closure-bearing means are displaced from a position underlying said aperture, said drive means comprising cooperable elements of which one cooperable element has a slot and the other has a projection moveable within said slot to thereby move said bracket member downwardly and to subsequently pivot said bracket member.

4,504,153

PHARMACIST-PROGRAMMABLE MEDICATION PROMPTING SYSTEM AND METHOD

Thomas A. Scholimeyer, and Jeffrey C. Elsmore, both of Tempe, Ariz., assignors to R. Dean Seeman, Apache Junction, Ariz., a part interest

Filed Aug. 8, 1983, Ser. No. 521,345
Int. Cl.³ G04B *4/700*
U.S. Cl. 368—10 **35 Claims**



1. An automatic medication prompting method comprising the steps of:

(a) coupling a data conductor of a portable prompting apparatus to a data conductor of a data inputting apparatus;

(b) entering information representative of medication instructions into said data inputting apparatus;

(c) converting said entered information into first digital data representative of times at or during which medication should be administered;

(d) converting said first digital data into second digital data having a format suitable for transmission to said portable prompting apparatus in order to effectuate programming of said portable prompting apparatus by said inputting apparatus;

(e) transmitting said second digital data to a first memory in said prompting apparatus and storing said second digital data in said first memory;

(f) decoupling said prompting apparatus from said inputting apparatus;

(g) continually periodically advancing a timekeeping circuit in said prompting apparatus;

(h) accessing said first memory in response to said timekeeping circuit each time a predetermined interval elapses to obtain stored prompting data indicative of whether a prescription should be administered at that time;

(i) generating an electrical prompting signal each time said obtained stored prompting data has a first value; and

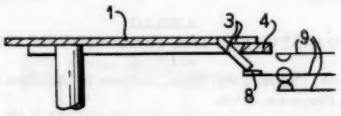
(j) producing an audible and/or a visual prompting signal in response to said electrical prompting signal.

4,504,154

INDEXING ELEMENT FOR SWITCHING A CHRONOMETER

Gerd Kammerer, St. Georgen, Fed. Rep. of Germany, assignor to Dieter Graessiin Feinwerktechnik, Fed. Rep. of Germany

Filed Dec. 23, 1982, Ser. No. 452,799
Claims priority, application Fed. Rep. of Germany, Dec. 9, 1981, 8148703
Int. Cl.³ H01H *43/00*; G05B *19/06*; G04C *21/00, 23/00*
U.S. Cl. 368—74 **28 Claims**



1. A programmable indexing device for controlling the sequence of operation of a chronometer comprising:

a continuously movable indexing element having a plurality of spaced incisions at an edge thereof forming a plurality of switch tabs between successive incisions, said indexing element consisting of flexible foil;

a retaining element disposed adjacent to said edge of said indexing element such that said switch tabs in an unprogrammed position slightly overlap said retaining element selected ones of said switch tabs being depressable against a restoring force and being held in a depressed programmed position beneath said retaining element for actuating a sensing device in said chronometer, said switch tabs being releasable from beneath said retaining element for return to said unprogrammed position by said restoring force for re-programming; and

a programming means having a pair of programming elements respectively disposed on opposite sides of said edge of said indexing element, said programming elements being individually actuatable for programming and for releasing said switch tabs.

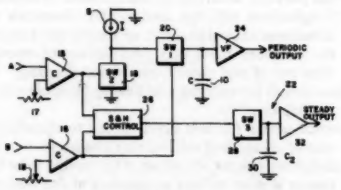
16. The indexing device of claim 1 wherein said sensing means is an electrical sensing means having a wiper.

4,504,155

TIME-TO-VOLTAGE CONVERTER

Joseph A. Ruggieri, Altamonte Springs, Fla., assignor to Chip Supply, Orlando, Fla.

Filed Mar. 1, 1984, Ser. No. 585,205
Int. Cl.³ G04F *8/00*
U.S. Cl. 368—121 **8 Claims**



1. A converter for converting a time interval to a measurement voltage proportional thereto comprising:

an essentially constant current source;

a first switch having a first terminal thereof connected to said current source;

a second switch connected in parallel with said current source;

a capacitor connected to a second terminal of said first switch and to said current source in a manner to permit said capacitor charge linearly with time only when said first switch is closed and said second switch is open, and to permit said capacitor to discharge only when said first switch and said switch are closed;

first event detection means for detecting a first event occurring when said first and second switches are closed, said first event detection means including first control means connected to said second switch for opening said second switch when said first event is detected thereby permitting said capacitor to charge; and

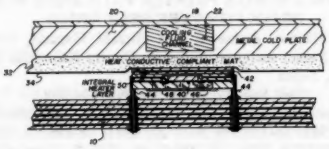
second event detection means for detecting a second event occurring after said first event while said capacitor is charging, said second event detection means including second control means connected to said first switch for opening said first switch when said second event is detected thereby providing said measurement voltage on said capacitor directly proportional to the time interval between the occurrences of said first and second events.

4,504,156

COOLING SYSTEM MONITOR ASSEMBLY AND METHOD

Thomas P. Currie, St. Paul, and Terry B. Zbinden, Maple Grove, both of Minn., assignors to Sperry Corporation, New York, N.Y.

Filed Jul. 6, 1982, Ser. No. 395,516
Int. Cl.³ G01K *13/00*; G01N *25/18*
U.S. Cl. 374—45 **6 Claims**



5. A cooling system monitor comprising:

subassembly means for supporting electronic components;

a plurality of electronic components mounted on said subassembly means;

a source of coolant fluid;

cold plate means mounted on said subassembly means in heat conductive relation to said plurality of electronic components and having a coolant channel therein in fluid communication with inlet and outlet ports coupled to said source of coolant fluid for removing heat from said plurality of electronic components to coolant flowing in said channel;

integral resistive heat generating means for generating a predetermined reference level of heat to be removed by said coolant, said predetermined reference level of heat selected for simulating a level of heat generated by selected ones of said electronic components;

support means mounted on said subassembly means having a plurality of support members each having a layer in a predetermined pattern of electrically conductive materials deposited on at least portions thereof, wherein said integral resistive heat generating means includes electrically conductive means deposited on one of said support members, and selected ones of said support members having apertures formed therein, said support members and layers positioned and contructed in a unitary body having a cavity formed by said apertures; and

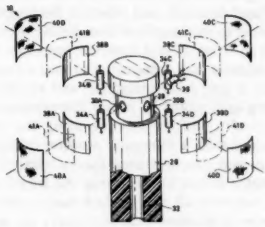
integrated circuit temperature sensing means mounted in said cavity for sensing the temperature of said integral resistive heat generating means and for providing output signals of predetermined current increments per degree of temperature sensed, wherein levels of temperature above said predetermined reference level of heat are indicative of failure of said coolant to adequately remove heat from said plurality of electronic components on said subassembly means.

4,504,157

CHILL TEMPERATURE METER

Austin Crabtree, Rte. 4, Box 265; James R. Crabtree, Rte. 4, Box 264, and Jeffrey Crabtree, Rte. 4, Box 265, all of Rockwood, Tenn. 37854

Filed Sep. 30, 1982, Ser. No. 431,158
Int. Cl.³ G01K *3/00*
U.S. Cl. 374—109 **15 Claims**



1. A non-directional sensor for determining the effect of prevailing composite environmental factors of wind velocity, real temperature, humidity and solar effects upon a human in the form of chill temperature, or chill factor, which comprises:

a central elongated core fabricated of a thermal insulating material;

a heat-producing element supported by and symmetrically surrounding said core to establish a selected temperature at the surface of said heat-producing element;

a fabric shroud covering said heat-producing element, said shroud having characteristics with regard to wind penetration, moisture absorption and solar radiation or reaction corresponding to characteristics of normal clothing worn by said human for said prevailing real temperature; and

circuit means electrically connected to said heat-producing element which includes means for supplying electrical power to said heat-producing element to produce and maintain said selected temperature at said surface of said heat-producing element, and means for determining the value of said electrical power as a measure of said chill temperature or chill factor.

4,504,158

POSITIONING DEVICE FOR A SELECTION MEMBER OF PRINTING MACHINES

Paolo Ciampi, Montalto Dora, and Raffaele Becchi, Ivrea, both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy

Filed Dec. 29, 1982, Ser. No. 454,288
Claims priority, application Italy, Dec. 30, 1981, 68709 A/81
Int. Cl.³ B41J *1/30*; H02K *7/06*; G05B *11/18*
U.S. Cl. 400—144.2 **11 Claims**

1. A positioning device for a selection member of a printing machine comprising:

detector means responsive to the movement of said selection member for generating position pulses indicative of given positions of said selection member;

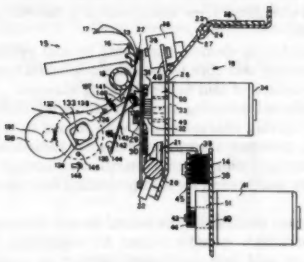
a magnetic positioner provided with a stator, a rotor connected for rotation with said selection member and an energizable winding for positioning said rotor into a plurality of stable positions with respect to said stator, wherein the stable positions of said rotor are univocally associated with the given positions of said selection member;

servomotor means including motor means energizable for moving said selection member and control means respon-

sive to the position pulses of said detector means for energizing said motor means until the selection member is moved to an area relative to a desired position of said given positions and then energizing said energizable winding for causing the rotor of said magnetic positioner to be positioned in one of said stable positions in order to position said selection member closely to the desired position of said plurality of given positions.

9. In a positioning device for a rotary member moved by a motor comprising a position transducer having a movable part connected with the rotary member; a detector mounted at a fixed position; a series of position indicators carried by said movable part, wherein each position indicator causes said detector to generate an electrical signal when said indicator is in front of said detector, and wherein the length of said signal is proportional to the length of time during which said position indicator is in front of said detector; memory means coupled with said detector and responsive to said signals to represent the position of said rotary member; and synchronizing means for actuating said motor to rotate the selection member at a constant velocity and for synchronizing the content of said memory means with a reference position of said rotary member, wherein said synchronizing means comprise:

time detector means for detecting the length of time of said signal, wherein all the position indicators except one of said series of position indicators have the same transverse dimension and one reference position indicator has a transverse dimension different from the transverse dimensions of all the other position indicators; and



storing means for storing two consecutive lengths of time of said signal, and wherein said synchronizing means respond to a given difference of time between the stored length of time of said storing means to synchronize said memory means with a reference position of said rotary member.

11. In a positioning device for a printer comprising a platen defining a printing line; a carriage movable in front of said platen and rotatably supporting a type wheel; a type wheel driving member carried by said carriage and actuatable for rotating said type wheel to select a type of said type wheel; a carriage driving member for moving the carriage in front of said platen; a type wheel transducer responsive to incremental rotations of the type wheel member for genertng corresponding wheel pulses; wheel memory means responsive to said wheel pulses to represent the angular position of the type wheel; a carriage transducer responsive to incremental movements of said carriage for generating corresponding carriage pulses; carriage memory means responsive to said carriage pulses to represent the carriage position with respect to the platen; initialization means for positioning said carriage at one reference position with respect to said platen and said type wheel at a reference angular position; and synchronization mean for synchronizing the content of the wheel memory means and the angular position of the type wheel at said one reference angular position and for synchronizing the content of the carriage memory means and the position of said carriage at said one reference position, the combination comprising:

a wheel index for rotating synchronously with the type wheel;

a carriage index fitted on the carriage; and

a single detector fixedly mounted with respect to the printing line and actuatable by the carriage index when the carriage is at said one reference position and wherein said detector is also actuatable by said rotary index when the carriage is in another reference position beyond said one reference position to the external of the printing line and when said type wheel is at said reference angular position; and

means responsive to actuation of said detector to synchronize the content of said carriage memory means with the reference carriage position and the content of said wheel memory with the reference angular position of said type wheel;

wherein said initialization means first moves the carriage into said one reference position whereby causing the carriage index to actuate said detector for the synchronization of said carriage memory means with said one reference position, then moves the carriage into said other reference position under the control of said carriage memory means and then actuates said type wheel driving member for continuously rotating said type wheel independently of the content of said wheel memory means until said wheel index actuates said detector to synchronize the wheel memory means with the reference angular position of said type wheel.

4,504,159

COMPACT SERIAL PRINTER WITH RACK PLATE DRIVE FOR TYPE BELT DRUM

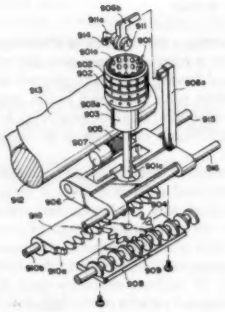
Hirofumi Hirano, Arakawa, and Hitoshi Hasumi, Chichibu, both of Japan, assignors to Canon Denshi Kabushiki Kaisha, Saitama, Japan

Filed Sep. 27, 1982, Ser. No. 424,538

Claims priority, application Japan, Nov. 9, 1981, 56-178379; Nov. 20, 1981, 56-185270; Nov. 20, 1981, 56-185271; Nov. 20, 1981, 56-185272; Dec. 1, 1981, 56-191835; Dec. 1, 1981, 56-191836; Dec. 2, 1981, 56-192801

Int. Cl.³ B41J *1/20*

U.S. Cl. 400—148 **5 Claims**



1. A printer comprising:

a cylindrical drum having a drive gear integral therewith;

a plurality of resilient type belts mounted on said cylindrical drum, each having a plurality of types thereon;

a print hammer positioned in said cylindrical drum;

means for selecting one of said type belts and for moving said selected type belt to a position opposite said print hammer;

inking means for applying ink to said types of the selected type belt;

means for causing said print hammer to project a type of said selected type belt;

rotating means for rotating said cylindrical drum, wherein said cylindrical drum is rotated as said type of said selected type belt is projected;

a worm shaft which meshes with said drive gear; and

a rack plate which is selectively meshed with said drive gear, wherein said cylindrical drum is moved in the direction of a print line by the engagement of said drive gear and said rack plate.

4,504,160

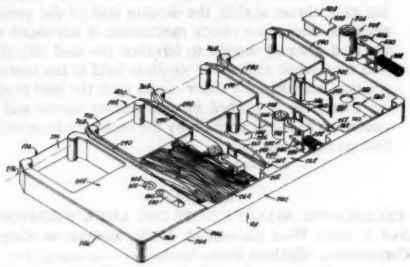
COLOR PRINTER AND MULTI-RIBBON CARTRIDGE THEREFOR

Errol G. Payne, Irvine; Charles D. McGregor, Santa Ana, and Tim M. Uyeda, South San Gabriel, all of Calif., assignors to Ramtek Corporation, Santa Clara, Calif.

Division of Ser. No. 133,889, Mar. 25, 1980, Pat. No. 4,403,874. This application Apr. 22, 1982, Ser. No. 370,936

Int. Cl.³ B41J *32/02*

U.S. Cl. 400—196.1 **6 Claims**



1. An ink ribbon cartridge comprising:

(a) a frame;

(b) means disposed within the frame for defining a plurality of compartments, each compartment having a ribbon supply area and an associated open pathway for passage of a ribbon loop, said pathways being spaced apart and serially arranged along a front face of the frame;

(c) a plurality of separate different colored continuous ribbons, each ribbon being disposed in an associated compartment ribbon supply area and having a loop portion extending through the associated pathway; and,

(d) drive means disposed within the cartridge for circulating each ribbon from the supply area through the pathway and back into the supply area, said drive means being configured for engagement with an external drive capstan.

4,504,161

PRINTING AND TYPING APPARATUS FOR THE SELECTIVE PRINTING OF SINGLE SHEET OR MARGINALLY PERFORATED ENDLESS PAPER

Hans-Werner Volke, Salzkotten; Jürgen Hilkenmeier, Paderborn; Hermann Kohlhage, Paderborn, and Udo Tewes, Paderbon, all of Fed. Rep. of Germany, assignors to Nixdorf Computer AG, Fed. Rep. of Germany

Filed Sep. 30, 1982, Ser. No. 430,082

Claims priority, application Fed. Rep. of Germany, Apr. 20, 1982, 3214531

Int. Cl.³ B41J *11/00*

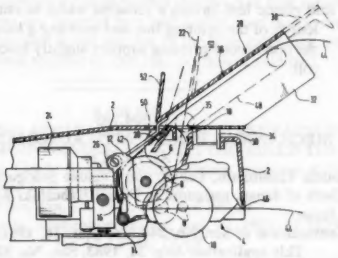
U.S. Cl. 400—605 **5 Claims**

1. For use in combination with a printer of the type which is used for single-sheet printing and which comprises a housing having in a top surface thereof adjacent single-sheet paper feed-in and feed-out openings, a separate feed-in opening for endless roll paper in another surface thereof a roller platen within the housing, and a tension roller mounted within the housing and biased into engagement with the platen but selectively pivotally displaceable away from the platen;

a device for selectively converting said printer from single-sheet-only operation to endless roll paper and single sheet multi-mode operation comprising:

a casing adapted to be placed on the printer housing and having an opening which is overlyingly coextensive with said single-sheet feed-in and feed-out openings of the printer;

endless roll paper tractor means carried by said casing for transporting endless roll paper from said endless roll opening, around said platen and through said single-sheet feed-out opening into said casing, said tractor means being driven from said platen when said casing is on said printer;



a lid mounted on the casing and slidable between a first position fully closing the casing and a second position permitting access into said casing and to said feed-in and feed-out printer openings;

means carried by said lid for mechanically extending into said printer housing and pivoting said tension roller away from said platen only when said lid is at least substantially in said first position;

and means for securing said casing to said housing, whereby opening said lid engages said tension roller with said platen and conditions said printer for single-sheet operation.

4,504,162

SERIAL PRINTER PROVIDED WITH CUTTER

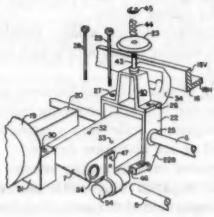
Marcello Speraggi, Milan, Italy, assignor to Honeywell Information Systems Italia, Milan, Italy

Continuation of Ser. No. 526,215, Aug. 24, 1983, abandoned, which is a continuation of Ser. No. 350,538, Feb. 19, 1982, abandoned. This application May 10, 1984, Ser. No. 608,921

Claims priority, application Italy, Feb. 24, 1981, 19936 A/81

Int. Cl.³ B41J *11/70*

U.S. Cl. 400—621 **4 Claims**



1. A serial printer provided with cutter, where printing is performed by a printing head mounted on a carriage sliding on guide bars parallel to the printing line and a continuous printing support is fed transversely to the direction of the printing line and leans on a substantially vertical platen, said platen having a sharp edge above the printing line and parallel to the direction of the printing line, such serial printer comprising:

(a) a lever mounted on said carriage and pivotable about one of said guide bars,

(b) a spring-loaded cutting roll mounted on said lever so as to be located over and close to said printing head, downstream of the printing line, said cutting roll having a substantially vertical axis of rotation

(c) an elastic leaf fixed to said lever, said leaf bearing against said platen so as to maintain said lever in a rest position where said cutting roll is apart from said platen,

(d) actuating means rocking said lever to bring said cutting roll in a cutting position where said cutting roll partially overlaps said sharp edge of said platen,

said elastic leaf having a reduced width as compared to the length of the printing line and exerting a local pressure on the continuous printing support slightly below the cutting roll.

4,504,163

MECHANICAL PENCIL WITH AUTOMATIC LEAD ADVANCE

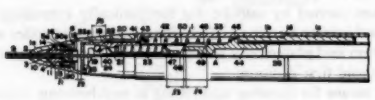
Junichi Hashimoto, Tokyo, and Tomozo Sekiguchi, Kawasaki, both of Japan, assignors to Pentel Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 244,326, Mar. 16, 1981, abandoned. This application Aug. 24, 1983, Ser. No. 525,798

Claims priority, application Japan, Mar. 31, 1980, 55-40156; Jun. 30, 1980, 55-88854; Oct. 31, 1980, 55-155911[U]; Feb. 19, 1981, 56-21432[U]

Int. Cl.³ B43K *21/16*

U.S. Cl. 401—53 **14 Claims**



1. A mechanical pencil comprising:

a tubular casing means;

slider means axially slidably mounted within said tubular casing means and constituted by a lead tube projecting from the writing end of said tubular casing means, a cylindrical member fixed to said lead tube, and a lead retainer mounted within said cylindrical member for frictionally holding lead therein;

first spring means mounted between said slider means and said tubular casing means and engaged only between said casing means and said slider means and biasing said slider means towards the writing end of the pencil;

collet chuck mechanism having:

a lead engaging collet axially movably mounted within said tubular casing means,

a chuck actuation device axially slidably mounted between said tubular casing means and said lead engaging collet, and

second spring means mounted between said chuck actuation device and said lead engaging collet and for biasing the lead engaging collet into a retracted position relative to said chuck actuation device;

third spring means in said casing means and having the forward end engaged only with said chuck actuation device for biasing said chuck actuation device towards the writing end of the pencil,

said collet chuck mechanism being normally spaced from said slider means in a direction away from the writing end of the pencil and retractable against said third spring means through lead engaged within said lead engaging collet with the positional relation of said collet chuck mechanism relative to said slider means being maintained constant when said slider means is retracted;

a tubular lead magazine coaxially and slidably mounted within said tubular casing means and being coactable with said chuck actuation device;

locking means in said tubular casing means at a position adjacent said slider means and frictionally engaging said slider means when said slider means is retracted to a rearward position for holding said slider means fixed relative to said casing means in the rearward position, the frictional resistance between said locking means and said slider means being greater than the recovery force of said first spring means; and

pusher means fixed to the end of said chuck actuation device which is toward said writing end for pushing said slider means for releasing the said slider means from its temporary engagement into said locking means at the rearward position to permit the slider means to move forward under the force of said first spring means,

whereby when an axial thrust is applied to the writing end of the pencil, the slider means and the collet chuck mechanism are retracted within said tubular casing with their positional relation being maintained constant, and when the axial thrust against the writing end of the pencil is released, said collet chuck mechanism is advanced with the lead grasped therein to advance the lead out of the lead tube while said slider means is held at the rearward position, and then the slider means with the lead projecting therefrom is pushed by said pusher means and advanced to its initial position by the recovery force of said first spring means.

4,504,164

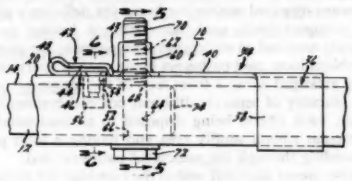
TELESCOPIC SHAFT COUPLING ARRANGEMENT

Alfred A. Bien, West Bloomfield, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed Aug. 6, 1984, Ser. No. 637,989

Int. Cl.³ F16B *7/10*

U.S. Cl. 403—109 **5 Claims**



1. A vehicle steering shaft coupling for telescopically locking an inner solid shaft member into an open end of an outer tubular shaft member, first and second axially spaced transverse bores in said inner member, said bores oriented with their principal axis parallel and aligned in a longitudinal plane of symmetry of said telescoped members, a pair of opposed holes in said outer member adapted for a coaxial alignment with said first bore, and at least one aperture in said outer member adapted for coaxial alignment with said second bore, said coupling comprising:

a one-piece metal clip including a sleeve portion and a resilient leg portion, said sleeve portion adapted for axial movement on said outer member, said leg portion extending from said sleeve portion toward said outer member open end and having an inwardly extending locking hub adjacent its free end, such that said hub is adapted to extend through said one aperture for locking reception in said second bore,

said leg portion having an upstanding collar formed with a passage adapted for coaxial alignment with said first bore and said pair of opposed holes,

whereby said members being initially telescopically coupled by said hub being received through said one aperture and into said second bore to thereby initially couple said members, and

said initial coupling locating said collar passage in alignment with said outer member pair of opposed holes and said first bore enablying fastener means to be subsequently received in said collar passage, said pair of opposed holes, and said first bore providing a dual locked coupling for said members.

4,504,165

BALL-AND-SOCKET JOINT, ESPECIALLY FOR MOUNTING THE CASING OF AN ORIENTABLE REAR-VIEW MIRROR

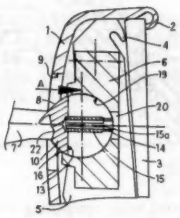
Guy Moeremans, Rueil, France, assignor to Regie Nationale des Usines Renault, Billancourt, France

Filed Dec. 31, 1981, Ser. No. 336,276

Claims priority, application France, Mar. 11, 1981, 81 04854; Oct. 6, 1981, 81 18778

Int. Cl.³ F16C *11/00*

U.S. Cl. 403—129 **1 Claim**



1. A ball-and-socket joint comprising:

a supporting rod;

a ball having a spherical outer surface, said ball comprising (i) a rear portion having a forward surface and (ii) a plurality of spherical sections abutting said forward surface of said rear portion and delimited by circumferentially extending grooves or slots therebetween,

said rear portion being integrally connected to an end of said supporting rod,

said ball having a central bore therein extending into said forward surface of said rear portion;

a socket having a spherical inner surface partially surrounding said ball,

said spherical internal surface being complementary to the spherical outer surface of said ball and frictionally engaging said spherical sections of said ball,

said socket having a relatively large rear central aperture and a relatively small front central aperture therein,

said rear aperture being disposed adjacent said supporting rod and dimensioned to receive said spherical sections of said ball when said sections are moved radially inward toward said bore,

said front aperture having an opening larger than said bore; and

a spring comprising a split tube having a longitudinal slot therein,

said tube being disposed in said bore and extending between said spherical sections of said ball and into said forward surface of said rear portion thereof,

the outer diameter of said tube being greater than the inner diameter of the portion of said bore extending into said forward surface of said rear portion of said ball when said slot is fully open,

said outer diameter of said spring being equal to said inner diameter of said portion of said bore when said slot is partially closed,

said tube being dimensioned to be insertable through said front aperture opening of said socket,

said spring resiliently urging said spherical sections of said ball against said internal surface of said socket, to permit rotation of said socket about said ball while maintaining said ball and socket in mutual frictional engagement,

said slot being dimensioned so that the edges thereof engage each other when said spherical sections are moved toward said bore, the engagement of said slot edges providing an inner stop to restrict further movement of said spherical sections toward said bore;

whereby said spring may be inserted into said socket through the front aperture thereof and said spherical sections of said ball may be inserted into said socket through the rear aperture thereof, with said spring preventing said spherical sections of said ball from being pressed together to an undesired extent when said spherical sections are inserted into said socket, and said spring may be installed in the portion of the bore extending into said forward surface of said rear portion of said ball.

4,504,166

METHOD AND APPARATUS FOR THE MANUFACTURE OF A BALL JOINT AND BALL JOINT OBTAINED THUS

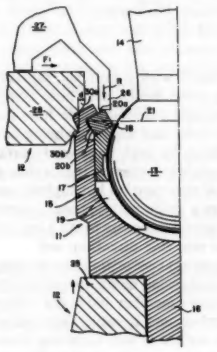
Gérard Morin, Conde Sainte Libiaire, France, assignor to Societe Anonyme D.B.A., Paris, France

Filed Jan. 25, 1982, Ser. No. 342,297

Claims priority, application France, Jan. 23, 1981, 81 01259

Int. Cl.³ F16C *11/08*

U.S. Cl. 403—147 **1 Claim**



1. A preloaded ball joint comprising a metal socket having an axis, a spherical pivot accommodated within said socket with a resilient grip bearing bush interposed between the pivot and socket, and a locking ring fixed in said socket, characterized in that said locking ring has a frusto-conical bearing surface in contact engagement with a corresponding frusto-conical end bearing surface of said bush, and a pair of frusto-conical outer surfaces converging outwardly toward a plane transverse to said axis, wherein the adjacent wall end portion of said socket is deformed radially inwardly along two approximately circumferential zones on both sides axially of said plane to surround at least the radially outermost portion of said ring.

4,504,167

RELEASABLE JOINT STRUCTURE

Masahiro Nakanishi, Tochigi, Japan, assignor to Kabushiki Kaisha Bandai, Tokyo, Japan

Filed Oct. 17, 1983, Ser. No. 542,328

Int. Cl.³ F16B *21/00*

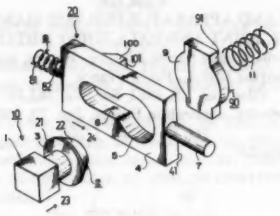
U.S. Cl. 403—325 **3 Claims**

1. A releasable joint structure for mounting a pivotal member on a stationary member comprising:

engaging means which is adapted to be fixedly connected to said pivotal member and comprises a cylindrical stem portion and an enlargement portion, one end of said cylin-

drical stem portion to be fixed to said pivotal member being extended from said one end to the other end of said cylindrical stem portion in a first direction, and the other end of said cylindrical stem portion being provided with said enlargement portion, said enlargement portion being defined by a backward surface perpendicular to a longitudinal axis along said first direction of said cylindrical stem portion and a forward surface continuing from said backward surface;

receiving plate means adapted to be mounted on said stationary member for releasably joining said engaging means, said receiving plate means having a front surface and a rear surface parallel to said front surface and being thinner than the length of said cylindrical stem portion along said first direction, said receiving plate means being adapted to be faced with said engaging means with said front surface being positioned perpendicular to said first direction and



being formed with a hole substantially centrally of said receiving plate means, said hole comprising a main hole and a laterally extending side hole communicating with said main hole, said main hole being larger in area than the area defined by said backward surface, said side hole having a slightly larger clearance than the diameter of said cylindrical stem portion but slightly smaller than said area to serve as a guide path for said cylindrical stem portion, and said lateral direction being a second direction perpendicular to said first direction; and

first biasing means comprising a coil spring and a plate member, said coil spring being connected at one end thereof to said stationary member and at the other end thereof to said plate member, and in which said plate member abuts on said back surface of said receiving plate means, for applying a force upon said forward surface in order to push said backward surface of said enlargement portion against said rear surface of said receiving plate means.

4,504,168

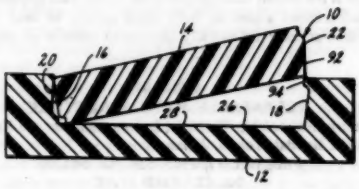
CONNECTING STRUCTURE

Michael C. Miller, 916 S. Balentine, Bloomington, Ind. 47401

Filed Mar. 27, 1981, Ser. No. 248,645

Int. Cl.³ F16B *5/07*

U.S. Cl. 403—353 **13 Claims**



1. Connecting structure comprising a first member having spaced apart opposed, oppositely directed substantially identical surfaces each of which have a cross section configuration including a short portion at one edge of the surface, a longer portion extending obliquely inwardly of the member and a connecting portion connecting the short portion and oblique portion of the surface cross section configuration and a second member having complementary spaced apart surfaces thereon adapted to engage the surfaces of the first member to secure the first and second members together.

4,504,169

REFLECTIVE ROAD STUDS

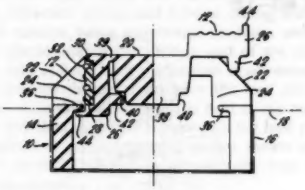
Graham R. Jones, Lancashire, United Kingdom, assignor to Inoventors Limited, Blackpool, United Kingdom

Filed May 18, 1983, Ser. No. 495,933

Claims priority, application United Kingdom, Nov. 3, 1981, 8133158

Int. Cl.³ E01F *9/06*

U.S. Cl. 404—11 **7 Claims**



1. A reflective road stud comprising a resiliently flexible downwardly open shell for mounting in a socket in a roadway, said shell having a top wall and a peripheral side wall encircling and depending from said top wall, said peripheral side wall having at least one portion which extends both downwardly from and outwardly of said top wall and at least one recess formed in said portion of the side wall, said recess having a wall extending generally vertically downwardly from said top wall of said shell on which one or more reflective elements are mounted and a ledge extending horizontally inwardly from said side wall towards the lower end of said vertical wall to rub against the reflective elements on said vertical wall when said top wall of said shell of the road stud is depressed by a passing vehicle, and means on the underside of said top wall of said shell to hold said vertical wall against deflection inwardly of said shell when said shell is depressed to ensure that the reflective elements on said vertical wall are wiped by the ledge.

4,504,170

BRIDGING EXPANSION JOINT DEVICE

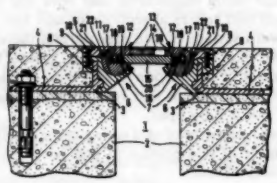
Manfred Schukolinski, Velbert, Fed. Rep. of Germany, assignor to Migua-Mitteldeutsche Gummi-und Asbestgesellschaft Hammerschmidt GmbH, Brugelweg, Fed. Rep. of Germany

Filed Dec. 21, 1982, Ser. No. 451,791

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1981, 3151516

Int. Cl.³ E01C *11/12*

U.S. Cl. 404—55 **7 Claims**



1. A bridging expansion joint device for covering a gap between two structural members comprising a spaced pair of

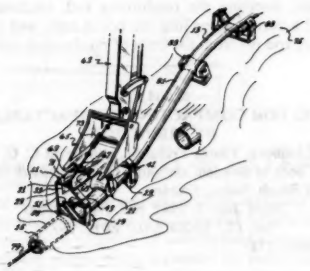
elongate anchor members, each said anchor member being adapted to be secured to a said structural member, said anchor members each including an inwardly facing arcuate groove, said grooves together defining a bearing box, a rigid bridging member mounted in each said groove, said bridging members each including a rigid arcuate outer marginal portion pivotally received in a said groove, the uppermost surfaces of said bridging members being in coplanar alignment, said plane being tangent to the arc of said groove, said bridging members including opposed inwardly facing free marginal edge portions, said bridging members further including opposed inwardly opening slots, said slots together defining a guideway, a longitudinally elongate support rail in said guideway having its opposed marginal edge portions received within said slots of said bridging members, and spring means reacting between said support rail and said bridging members for centering said rail between said bridging members.

4,504,171

LINER INSTALLATION TOOL AND METHOD

Henry S. Florence, Jr., Bakersfield, Calif., assignor to Getty Synthetic Fuels, Inc., Signal Hill, Calif.

Filed Sep. 2, 1983, Ser. No. 528,931
Int. Cl.³ F16L *1/00*; B23P *19/04*; E03B *7/00*
U.S. Cl. 405—154 **16 Claims**



1. An installation tool for use in installing a liner within an underground pipe comprising:
- a frame;
- a distal guide mounted on the frame for engaging the lower side of the liner at a distal location;
- an intermediate guide mounted on the frame for engaging the upper side of the liner at an intermediate location proximally of the distal location;
- a proximal guide;
- means for mounting the proximal guide on the frame for engaging the lower side of the liner at a proximal location proximally of the intermediate location and above the distal location whereby the liner can be curved by the guides for insertion into the underground pipe; and
- a releasable clamp for retaining the liner in an essentially fixed position along the guides.

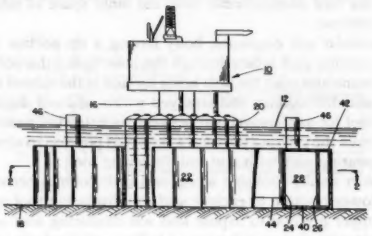
4,504,172

CAISSON SHIELD FOR ARCTIC OFFSHORE PRODUCTION PLATFORM

John D. Clinton, London, England, and Gerhard H. Reusswig, Irving, Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Jul. 11, 1983, Ser. No. 512,803
Int. Cl.³ E02B *17/00*
U.S. Cl. 405—217 **17 Claims**

1. An offshore production platform structure for use in iceberg-infested waters comprising:
- an above-water platform section;
- a support section extending from the marine floor to said platform section; and
- a massive annular caisson shield spaced radially outwardly from said support section and extending from the marine floor toward the marine surface;
- said caisson shield comprising an inner wall, an outer wall, a plurality of closed compartments formed between said inner wall and said outer wall, and a plurality of arched wall sections extending radially outwardly from said outer wall;
- said arched wall sections being constructed to progressively crush the leading edge of an impacting iceberg, said closed compartments being constructed to absorb maximum anticipated ice thrust forces including local punching failure of said outer wall, and said caisson shield being constructed to slide laterally while maximum anticipated ice thrust forces are being dissipated.

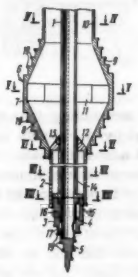


4,504,173

APPARATUS FOR CONSTRUCTING CAST IN PLACE TUBULAR PILES AND METHOD OF CONSTRUCTING SUCH PILES BY SAME APPARATUS

Valentin I. Feklin, Dnepropetrovsk, U.S.S.R., assignor to Dnepropetrovsky Inzhenerno-Stroitelny Institut, Dnepropetrovsk, U.S.S.R.

Filed Sep. 22, 1982, Ser. No. 421,090
Claims priority, application U.S.S.R., Sep. 22, 1981, 3330151; Dec. 25, 1981, 3372779
Int. Cl.³ E02D *5/56, 15/40*
U.S. Cl. 405—240 **1 Claim**



1. An apparatus for constructing cast in place tubular piles comprising:
- a hollow drill column having an end portion and an inner space defining a passageway for a first material;
- a hollow soil displacing body immovably mounted on said drill column and having a cylindrical sizing portion, a lower tapered portion having an outer helical ribbon surface terminating in a first opening of a predetermined diameter, and an upper tapered portion terminating in a second opening;

a feeding tube attached to said upper tapered portion around the second opening of said soil displacing body and laterally spaced from and surrounding said drill column to define a passageway for a second material;

a hollow tapered soil displacing tool having an outer helical ribbon surface and an inner space, said displacing tool attached to the end portion of said drill column below said soil displacing body so that the inner space of said displacing tool communicates with the inner space of said drill column;

a tubular soil displacing body having a tip portion and a pouring port wherethrough the inner space thereof communicates with the hole being formed in the subsoil and of said drill column and arranged within said soil displacing tool for axial movement between an extended position to open the pouring port and a retracted position to close the pouring port with said soil displacing tool;

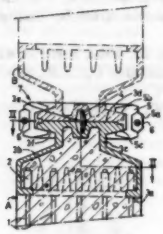
a skirt axially movable along said drill column between a lower position to enclose said soil displacing tool and an upper position to expose said soil displacing tool and to close the first opening in said hollow soil displacing body.

4,504,174

ELONGATED ELEMENTS OF PRE-STRESSED CONCRETE, ADAPTED TO BE ASSEMBLED END TO END

Pierre Barthel, conches, France, assignor to Freyssinet International (STUP), Boulogne-Billancourt, France

Filed Jan. 4, 1983, Ser. No. 455,518
Claims priority, application France, Jan. 11, 1982, 82 00294
Int. Cl.³ E02D *5/58*
U.S. Cl. 405—252 **6 Claims**



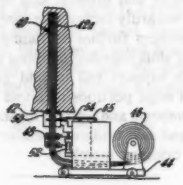
1. Apparatus for assembling two elongated elements of concrete pre-stressed by a plurality of tensioned reinforcements molded in and adherent to said concrete, said reinforcements each having terminal lugs mounted on their ends, said lugs having a diameter larger than that of said reinforcements, comprising two frames, each frame being disposed on and enclosing the end portion of one of said elements, each of said frames having an inner end and an outer end, each of said frames having on its inner end an inwardly turned flange molded and embedded in the respective concrete element, each of said flanges having a plurality of spaced-apart notches therein for housing the ends of said reinforcements and for hooking and retaining said terminal lugs, the width of said notches being substantially the same as the diameter of said reinforcements, and each of said frames having on its outer end means for attaching said outer end to the outer end of the other of said frames, said frames therefore being adapted for holding said reinforcements while said reinforcements are being tensioned and after the concrete comprising said elements has cured.

4,504,175

HOLLOW ROD AND METHOD OF MAKING AND USING

Earl M. Zion, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Continuation of Ser. No. 290,036, Aug. 5, 1981,. This application Sep. 22, 1983, Ser. No. 534,270
Int. Cl.³ E21D *20/02*
U.S. Cl. 405—260 **8 Claims**



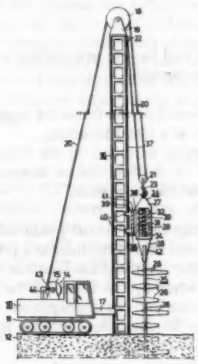
1. A method of reinforcing an underground chamber roof comprising boring a hole in the chamber roof, drawing a plurality of glass filament reinforced thermoset resin reinforcing rod elements respectively from coils thereof and progressively assembling them, at a locus upstream of and aligned with the entry to the bored hole, into a substantially rigid essentially non-coilable hollow reinforcing rod aligned as formed with the bored hole, inserting the reinforcing rod, hardenable liquid resin, and a curing agent into the bored hole, and cutting the reinforcing rod off from the coils of reinforcing rod elements.

4,504,176

METHOD FOR COMPACTING COMPACTABLE SOILS BY VIBRATION

Bertil J. Lindberg, Västra Frölunda, and Bernt C. G. Elmefjäll, Upsala, both of Sweden, assignors to Byggnads-& Industriservice AB Binab, Solna, Sweden

Filed Jun. 2, 1982, Ser. No. 384,440
Int. Cl.³ E02D *3/02*; E01C *19/34*
U.S. Cl. 405—271 **4 Claims**



1. A method for compacting compactable soils by vibration while using a compacting apparatus comprising an elongate member having a vibrator mounted on one end thereof, and further having laterally projecting fins arranged in use in substantially vertical planes along at least part of the elongate member, said method comprising:

a. establishing a set-point value corresponding to a desired degree of compaction of said compactable soils and representing a load required to lift the elongate member from a compacted location while vibrating;

b. inserting the elongate member substantially vertically to a given depth into soil to be compacted and vibrating the

elongate member to densify and compact soil surrounding said elongate member; and

c. withdrawing the elongate member from a compacted location when the load required to lift the elongate member from said location while vibrating is at least equal to said established set-point value.

4,504,177

EMPTYING APPARATUS FOR A SILO

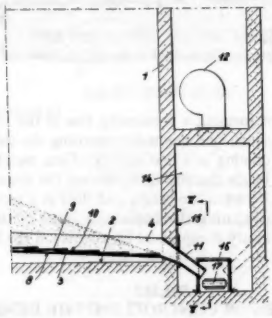
Jean H. Lagneau, 1, Grande Rue, Tremblay-les-Villages, Chateauneuf-en-Thymerais, 28170, France

Filed Jan. 13, 1983, Ser. No. 457,649

Claims priority, application France, Jan. 15, 1982, 82 00575; Jun. 18, 1982, 82 10650

Int. Cl.³ B65G *53/02*

U.S. Cl. 406—86 **7 Claims**



1. An emptying apparatus for a silo with a bottom, said apparatus comprising:

(a) a floor located above said silo bottom, said floor comprising a plurality of hollow ribs, adjacent hollow ribs being connected by a plurality of overlapping sheets, adjacent overlapping sheets being separated by individual slits, a plurality of ventilating channels located directly above the bottom of the silo, each of said ventilating channels being defined by said silo bottom, a first wing extending downwardly from a respective rib to the bottom of said silo, one of said ribs, and a second wing extending downwardly from an adjacent rib, each of said ventilating channels opening into a single canal which is pressurized by a blower, a shutter being associated with each of said channels and comprising means for selectively obturating an orifice located at one end of each said ventilating channel, each of said ribs having an upper portion which forms, in combination with a set of said overlapping sheets, an emptying channel which opens into an evacuation duct located within said canal, each of said emptying channels being fluidically connected to said evacuation duct by a spout.

4,504,178

TOOL FOR TRIMMING OF EDGES

Heinz Seidenfaden, Varel, Fed. Rep. of Germany, assignor to Vereinigte Flugtechnische Werke GmbH, Bremen, Fed. Rep. of Germany

Filed Dec. 11, 1980, Ser. No. 215,362

Claims priority, application Fed. Rep. of Germany, Dec. 11, 1979, 2949656

The portion of the term of this patent subsequent to Jul. 21, 1998, has been disclaimed.

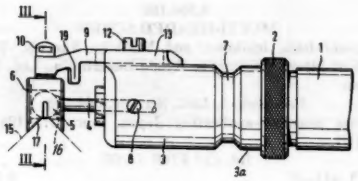
Int. Cl.³ B23C *1/20*

U.S. Cl. 409—138 **12 Claims**

1. A machine tool for chamfering, deburring, and trimming edges, or the like, of a workpiece, there being a tool support means, including a motor-driven shaft and a tool head, the shaft projecting from the tool head, further including a cutter element mounted for rotation and rotating about a first axis, being the axis of the shaft, the improvement comprising:

a holding means mounted to the tool head extending therefrom and essentially parallel to the shaft;

a guide member having an arcuate slot having a V-shaped cross section, being defined by bevelled curved edges and extending in a plane of curvature, the member being of hollow construction for receiving the cutter element; and



a journal pin located to one side of the cutter element for pivotally mounting the guide member on the holding means so that the guide member extends from the holding means toward and receives the cutter element and is cantilevered in relation to the holding means, the pin establishing a first pivot axis extending at right angles to said first axis, the guide member being capable of pivoting about the first pivot axis, thereby pivoting the plane of the arcurate slot.

4,504,179

CLAMPING SLEEVE FOR TOOLS OR WORKPIECES

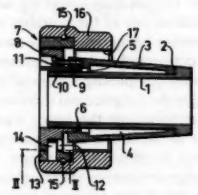
Curt Nicolin, Grödinge, Sweden, assignor to Handelsbolaget Eminent, Sven Hultman & Co., Eskilstuna, Sweden

Filed Jun. 10, 1982, Ser. No. 387,036

Claims priority, application Sweden, Jun. 11, 1981, 8103669

Int. Cl.³ B23B *31/40*

U.S. Cl. 409—234 **5 Claims**



1. A clamping sleeve, adapted for use with a spindle, for tools or workpieces to be clamped by said sleeve and provided with a truncated conical surface for engagement with a rotatable driving portion of the spindle having a conical surface, the clamping sleeve supporting the tool or workpiece with a substantially cylindrical surface concentric with the truncated conical surface, a thrust collar provided on said sleeve with threads so as to be screwed axially in both directions on cooperating threads provided on the rotatable driving portion and concentrically with the axis of the conical surface, the clamping sleeve being tightened by the thrust collar, wherein the truncated conical surface and the cylindrical surface comprises spaced mantles which sealingly attach to each other at a top end of the sleeve, said mantles forming a cavity filled with a substantially incompressible medium, a base surface defined by said sleeve, the cavity opening towards said base surface, the thrust collar arranged at the base surface and axially movable relative to the sleeve and provided with an axially directed collar, an orifice defined in the cavity between the mantles and the collar extending into the orifice, at least one screw extending axially through bores defined in the thrust collar and screwed onto the end of one of the mantles for securing the

thrust collar in a position relative to the collar so that axial displacement of the thrust collar is permitted, the thrust collar pressed towards the base surface upon continued turning of the thrust collar after the sleeve is tightened against the conical surface and the collar is pressed inwards in the cavity, so as to subject the medium to an increasing pressure and press the mantles towards the conical surface and the surface of the tool or workpiece corresponding to the substantially cylindrical surface.

4,504,180

MULTI-HEADED SCREW

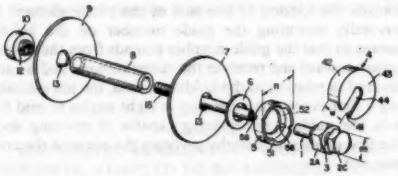
Nobuyushi Ishii, Ichikawa, and Yukihiko Yamada, Yamato, both of Japan, assignors to Kyodo Electric Co., Ltd., Tokyo, Japan

Filed Feb. 1, 1982, Ser. No. 344,620

Claims priority, application Japan, Apr. 27, 1981, 56-60916[U]

Int. Cl.³ F16B *31/00*

U.S. Cl. 411—5 **6 Claims**



1. A fastener arrangement comprising:

a threaded screw member having a plurality of heads disposed in a longitudinal direction of the threaded member, each of said plurality of heads being interconnected with its adjacent head by a neck portion, said neck portion being so thin as to be sheared when a tightening torque is applied thereto which exceeds a predetermined value, said threaded member including an annular step portion;

a collar member for partially covering said heads with at least the outermost one of the plurality of heads exposed, said collar member being detachably mounted around the neck portion connected to said outermost head;

said collar member comprising a generally cylindrical portion extending in the longitudinal direction of the threaded member for surrounding the heads except at least said outermost one of the heads, and a generally disk-like end portion having a generally U-shape opening formed therein of a size to receive said neck portion, said end portion being detachably mounted around said neck portion, said cylindrical portion having an opening through which the heads surrounded by said cylindrical portion pass when said U-shape opening is being engaged with said neck portion; and

a cap member disposed within the generally cylindrical portion of said collar member, and comprising an annular skirt portion for surrounding at least one of the heads except at least said outermost head with a space provided therebetween, and a flange portion which extends radially inwardly with respect to the longitudinal direction of said threaded member and has a circular, central opening engageable with the annular step portion of said threaded member;

said annular skirt portion having a generally cylindrical, inner surface which defines said space and has a lateral cross section having a protrusion extending radially inwardly so as to prevent a driving portion of a driving tool applicable to said at least one of the heads surrounded by the annular skirt portion from being disengaged when received in said space;

the heads, except at least said outermost head, being substantially enclosed by said collar and cap members when said collar and cap members are mounted on said threaded member.

4,504,181

METHOD OF FORMING SCORED METAL SHEET

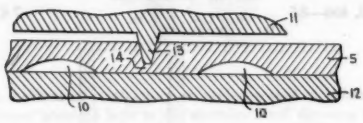
Nick S. Khoury, Worth, Ill., assignor to Continental Can Company, Inc., Stamford, Conn.

Continuation-in-part of Ser. No. 964,760, Nov. 29, 1978, Pat. No. 4,348,464. This application Sep. 14, 1982, Ser. No. 417,980

The portion of the term of this patent subsequent to Sep. 7, 1999, has been disclaimed.

Int. Cl.³ B21D *17/02, 51/38*

U.S. Cl. 413—17 **4 Claims**



1. A method of forming a weakening line in the form of a score in a metal sheet, said method comprising the steps of in a first operation coining in a first surface of the metal sheet a pair of adjacent beads thereby compressing the metal of the sheet in the area between the beads, and then in a second and separate operation scoring the opposite surface of the metal sheet in the previously compressed area between the beads.

4,504,182

PROCEDURE FOR CONTROLLING THE DENSITY DISTRIBUTION OF WOOD CHIPS AND DEVICE THEREFOR

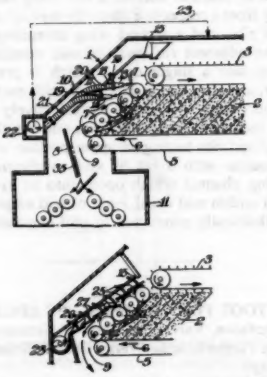
Wolfgang Bürkner, Darmstadt, Fed. Rep. of Germany, assignor to Carl Schenck AG., Fed. Rep. of Germany

Filed Jun. 28, 1982, Ser. No. 392,334

Claims priority, application European Pat. Off., Jul. 4, 1981, 81105215.8

Int. Cl.³ B65G *65/42, 65/40*

U.S. Cl. 414—327 **8 Claims**



1. A device for controlling the density distribution of wood chips over a specified width comprising a chip supply container, several discharge rollers arranged one above the other, a base belt, feed devices, and a discharge opening extending over the width of the container, characterized thereby that at least one suction pipe with predetermined width and adjustable in both vertical and transverse directions is arranged close to and in front of the discharge rollers for removing a portion of

the chip mass discharged from the rollers, and a chip collection device connected to the suction pipe.

5. A method for controlling and unifying the density distribution of wood chip material or the like to be spread over a specific width, comprising the steps of downwardly flowing several partial streams of wood chip material or the like from a supply source to a discharge, determining which partial streams include excess material sufficient to cause a non-uniform density distribution of the material over the specified width, removing excess material between the supply source and discharge from those downwardly flowing streams determined to be excessive, and combining the adjusted and remaining partial streams into a discharge mass flow.

4,504,183

BAG OPENING MACHINE

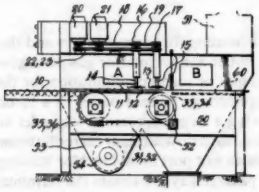
Stewart Bennison, Chesterfield, and Ronald L. Linnik, Denton, both of England, assignors to JSK Company Ltd., Derbyshire, England

Filed Feb. 5, 1982, Ser. No. 346,269

Claims priority, application United Kingdom, Feb. 14, 1981, 8104670

Int. Cl.³ B65G 65/04

U.S. Cl. 414—412 **10 Claims**



1. A bag opening and emptying machine comprising:

a substantially horizontal conveyor upon which said bag is conveyed, said conveyor comprising an endless band carried by rear and forward guide rollers,

spike members extendible outwardly from and retractable inwardly of a conveying surface of the band,

means for feeding a bag which is to be opened and emptied onto the surface of said horizontal conveyor,

means for extending said spike members from the surface of the band so as to impale the bag and firmly secure it to the conveyor,

cutting means adjacent the conveyor past which the bag is conveyed in a conveying direction and which serve to make a continuous cut around three sides of the bag whereby the bag is cut into upper and lower halves hingedly joined at the rear or trailing side of the bag,

the conveyor serving to convey one half of the bag impaled on the spike members over the forward guide roller while the other half unfolds therefrom to release the contents of the bag,

receiving means for collection of the contents of the bag,

means for retracting said spike members to release the empty bag from the conveyor, and

collection means for the empty bag,

4,504,184

COMBINED HOIST-DUMP ASSEMBLY FOR TRUCKS

Roger B. Beam, and Donald H. Beam, both of 2887 Gaines Rd., Albion, N.Y. 14411

Filed Oct. 20, 1982, Ser. No. 435,488

Int. Cl.³ B60P 1/64

U.S. Cl. 414—498 **22 Claims**

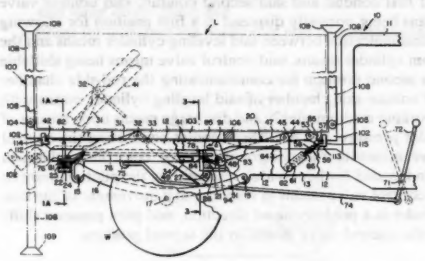
9. A truck, comprising

a frame,

an operating member movably mounted on said frame,

drive means on said frame connected to said operating member and operable to swing said member with arcuate, translational movement and in opposite directions about a pair of spaced, parallel axes,

a load bed releasably attached to said member to be raised and lowered thereby between a first horizontal position in which the bed is supported on said frame, and a second horizontal position spaced above said first position,



means operative in response to the movement of said bed from said first to said second horizontal position automatically to detach said bed from said member thereby to permit the detached bed to be supported in said second position independently of said operating member, and

means for selectively reattaching said bed to said member during the lowering of said bed by said member from said second position.

4,504,185

HYDRAULIC CIRCUIT OF HYDRAULIC POWER SHOVEL

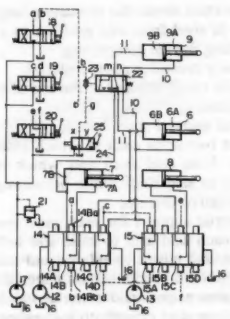
Takashi Yagyu, Ibaraki; Takeshi Yamaguchi, Tsuchiura; Sotaro Tanaka, and Yasuo Sakaki, both of Ibaraki, Japan, assignors to Hitachi Construction Machinery Co., Inc., Tokyo, Japan

Filed Aug. 12, 1982, Ser. No. 407,630

Claims priority, application Japan, Aug. 18, 1981, 56-128244; Aug. 26, 1981, 56-132601

Int. Cl.³ E02F 3/86

U.S. Cl. 414—700 **9 Claims**



1. A hydraulic circuit of a hydraulic power shovel comprising a chassis, a boom pivotally mounted on the chassis, an arm pivotally mounted on said boom, the hydraulic circuit comprising a boom cylinder means pivotally mounted between the chassis and the boom for moving the boom in an upward and downward direction, an arm cylinder means pivotally mounted between said boom and said arm for driving the arm around the connection point between the arm and the boom, a leveling cylinder means pivotally mounted between said arm and said boom for supplying a working medium to the boom cylinder to drive the boom in response to a movement of the arm, a first conduit means for connecting a rod-side chamber of

said leveling cylinder means to a rod-side chamber of said boom cylinder means, a second conduit means for connecting a bottom-side chamber of said leveling cylinder means to a bottom-side chamber of said boom cylinder means, a control means for respectively controlling the boom cylinder means and said arm cylinder means, a control valve means disposed in said first conduit and said second conduit, said control valve means being normally disposed in a first position for allowing a communication between said leveling cylinder means and the boom cylinder means, said control valve means being shiftable to a second position for communicating the rod-side chamber and bottom-side chamber of said leveling cylinder means with a working medium supply and discharge means upon receipt of a pilot pressure, and a further conduit connecting the control valve means to the control means for controlling the arm cylinder, said further conduit transmitting the pilot pressure to the control valve means in response to a movement of the arm cylinder in a predetermined direction, said pilot pressure shifting the control valve means to the second position.

4,504,186

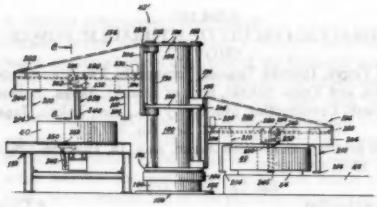
TURRET STACKER

Lawrence J. Richards, Elk Grove Village, Ill., assignor to Braner Enterprises, Schiller Park, Ill.

Continuation of Ser. No. 422,721, Sep. 24, 1982, abandoned, and a continuation-in-part of Ser. No. 288,479, Jul. 30, 1981, abandoned. This application Dec. 27, 1983, Ser. No. 565,475

Int. Cl.³ B65G *57/03*

U.S. Cl. 414—744 A **6 Claims**



1. A transportion device for relocating large, heavy material such as coils of steel from one position to a second position, said transporting device comprising;

a. a stationary central support pedestal,

b. a rotatable turret situated at the top of said pedestal, said turret including

i. a central support shaft,

ii. at least two arms each of which extends radially outwardly from said shaft and which is rotatably fixed relative to said shaft while permitting vertical movement relative thereto,

iii. a material support for each arm, means to raise and lower each said arm to raise and lower said material support, and means to enlarge and contract said material support to accommodate material of varying horizontal dimensions, said material support and said arm being connected directly to said support shaft,

iv. said material support comprising a guide extending substantially the length of said arm and a pair of carriages located on said guide, each carriage being laterally moveable along said guide from an end thereof toward the center thereof in a direction opposite to the other carriage to enlarge or contract the separation between the carriages, said carriages including rests for holding material to be relocated and abutting opposite sides of said material as it is relocated,

c. bearing means between said pedestal and said turret to facilitate rotation of said turret, and

d. driving means situated in said pedestal and attached to said turret to rotate said turret.

4,504,187

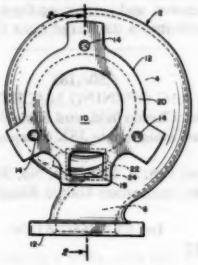
TURBOCHARGER METHOD OF OPERATION AND TURBINE HOUSING THEREFOR

Hugh MacInnes, La Canada; Jon A. Meyer, Arleta; Andrew E. Johnston, Granada Hills, and John W. Fort, Jr., Woodland Hills, all of Calif., assignors to Roto-Master, Inc., N. Hollywood, Calif.

Filed May 10, 1982, Ser. No. 376,492

Int. Cl.³ F01D *17/00, 25/24*

U.S. Cl. 415—1 **9 Claims**



1. In a turbine housing for turbochargers and the like having an inlet and an outlet and an interior gas passageway of spiral converging aperture or scroll configuration for the passage of exhaust gas therethrough to said outlet to a turbine, said gas passageway having a large aperture at said inlet and a smaller aperture at its terminus downstream thereof, the improvement which comprises an exit port in said turbine housing positioned within said gas passageway proximate the terminus of said gas passageway such that the entirety of said gas is required to travel the extent of said passageway to said terminus to impart a high tangential gas velocity and cause the turbine to run at a higher efficiency range, said exit port comprising means for selectively permitting the passage of bypass gas therethrough.

4,504,188

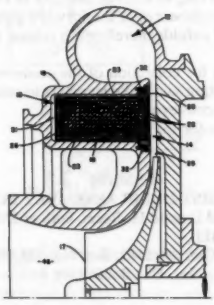
PRESSURE VARIATION ABSORBER

Darwin G. Traver, DeWitt; Carl M. Anderson, Syracuse, both of N.Y., and Amr N. Abdelhamid, Luzerne, Canada, assignors to Carrier Corporation, Syracuse, N.Y.

Division of Ser. No. 14,525, Feb. 23, 1979, Pat. No. 4,411,592, which is a continuation of Ser. No. 815,330, Jul. 13, 1977, abandoned. This application Aug. 1, 1983, Ser. No. 518,992

Int. Cl.³ F04D *29/66*

U.S. Cl. 415—1 **3 Claims**



1. A method of operating a centrifugal compressor having an impeller, a diffuser and a collector, comprising the steps of:

accelerating a compressible fluid with the impeller;

converting the compressible fluid velocity pressure to static pressure within the diffuser;

collecting the compressible fluid discharged from the diffuser within the collector at a relatively high static pressure; and

absorbing acoustic and aerodynamic pressure variations of the compressible fluid within the diffuser with a resonant cavity located behind a porous absorbing material which forms a portion of a side wall of the diffuser, said porous absorbing material having a flow resistance approximately equal to the density of the compressible fluid multiplied by the speed of sound in the compressible fluid.

4,504,189

STATOR VANE FOR A GAS TURBINE ENGINE

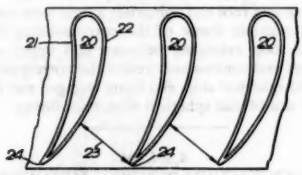
Barry W. Lings, Derby, England, assignor to Rolls-Royce Limited, London, England

Filed Oct. 26, 1983, Ser. No. 545,774

Claims priority, application United Kingdom, Nov. 10, 1982, 8232089

Int. Cl.³ F01D 9/06

U.S. Cl. 415—115 **3 Claims**



1. A stator vane assembly for a gas turbine engine comprising:

a plurality of vanes arranged in an annular array, each of said vanes including an aerofoil having a convex flank, a concave flank and a continuous spanwise extending trailing edge, a throat between each of adjacent vanes, each said throat being defined by said continuous spanwise extending trailing edge of a particular one of said vanes and said convex flank of the adjacent vane in said annular array, said aerofoil of each of said vanes having an aerodynamic profile defined by a stack of planar elemental aerofoil sections, each of said planar elemental aerofoil sections of each one of said vanes having a trailing edge forming part of said spanwise trailing edge of said aerofoil of the particular one of each one of said vanes, said planar elemental aerofoil sections for each of said vanes being stacked to provide said concave flank of said aerofoil of each of said vanes with a concave shape in the spanwise direction and to provide said convex flank of said aerofoil of each of said vanes with a concave shape in the spanwise direction, said trailing edges of the stack of said planar elemental aerofoil sections of each of said vanes being disposed in a single plane extending substantially parallel with said throat between adjacent vanes.

4,504,190

FLOW CONTROL APPARATUS AND METHOD

Leendert A. Beeloo, Venice, Calif., assignor to Gas Power Systems, Inc., Cerritos, Calif.

Filed Mar. 9, 1983, Ser. No. 473,747

Int. Cl.³ F01D 17/16

U.S. Cl. 415—166 **18 Claims**

4. A fluid-handling rotary apparatus comprising:

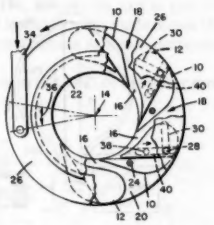
a plurality of identical nozzle means each of which comprises a fixed-spacer member and an adjustable-segment member;

an outer cover plate;

an inner cover plate;

said fixed-spacer member being rigidly fastened to, and sandwiched in abutting relationship between, said outer cover plate and said inner cover plate in such a manner that, when said apparatus is in use, essentially no flow of fluid occurs between a first surface of said fixed-spacer member which abuts said outer cover plate and between a second surface of said fixed-spacer member which abuts said inner cover plate; and

a means for adjusting the position of said adjustable-segment



member relative to said fixed-spacer member, such that said adjustable-segment member is movable in a straight-line direction, without any pivotal movement.

18. The apparatus of claim 4, wherein said fixed-spacer member forms with a rotor an angle into-the-rotor for fluid to enter said rotor, and wherein said angle into-the-rotor remains essentially constant for all adjustable positions of said nozzle means thereby permitting said angle into-the-rotor to be predetermined for highest operating efficiency.

4,504,191

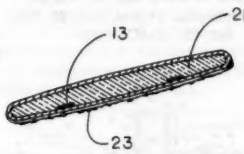
HEATED CEILING FAN

David J. Brown, 104 Ashley Brook Ct., Mauldin, S.C. 29662

Filed Oct. 29, 1982, Ser. No. 437,540

Int. Cl.³ F04D 29/38

U.S. Cl. 416—5 **2 Claims**



1. A ceiling fan, comprising:

a plurality of blades, each of said blades defining a generally hollow interior portion, each of said blades having a lower surface, said lower surface having a rough coating of particles to enhance the emission of heat therefrom;

means for rotating said plurality of blades about a vertical axis;

means for attaching said means for rotating to a ceiling;

resistance heating elements extending lengthwise through said hollow interior portion of said blades extending from near said axis to the opposite end of each of said blades and returning lengthwise opposite through said blade toward said axis, said hollow interior portion above said heating element being generally filled with an insulating material and the hollow interior portion below said heating elements being filled with a heat conducting material; and

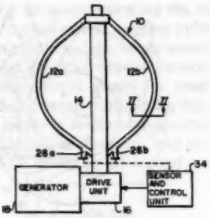
control means for independently controlling said heating means and said means for rotating.

4,504,192

JET SPOILER ARRANGEMENT FOR WIND TURBINE

Jack D. Cyrus, Corrales; Emil G. Kadlec, and Paul C. Klimas, both of Albuquerque, all of N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Sep. 15, 1983, Ser. No. 532,430
Int. Cl.³ F03D 7/06
U.S. Cl. 416—41 **13 Claims**



1. A vertical-axis wind turbine comprising a rotor assembly and a load powered from said rotor assembly through a drive unit, said rotor assembly comprising: at least one hollow rotor blade having opposed blade surfaces mounted for rotation about a vertical axis, said blade having an air inlet opening at one end located near the axis and a plurality of air outlet aperture means for causing flow separation along a substantial portion of each blade surface between the leading edge and trailing edge of the blade, said outlet aperture means being further from the axis than said inlet opening;

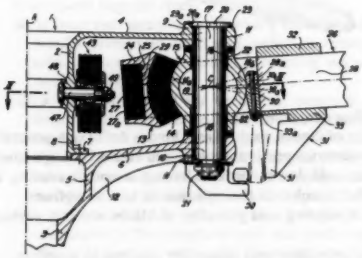
whereby air drawn into the inlet opening will flow out of said apertures and interfere with the air flow across the blade, thereby reducing power produced by the turbine.

4,504,193

HELICOPTER ROTOR WITH ARTICULATION MEANS INTEGRATED IN THE ROOT OF THE BLADE

René L. Mouille, Aix-en-Provence, France, assignor to Societe Nationale Industrielle Aerospatiale, Paris, France

Filed Sep. 24, 1982, Ser. No. 423,401
Claims priority, application France, Nov. 25, 1981, 81 22027
Int. Cl.³ B64C 27/38
U.S. Cl. 416—140 **19 Claims**



1. A helicopter rotor comprising:

at least two blades, each of which having a resistant frame extending to a corresponding blade root end,

a rigid hub having

a central drum secured to a top part of a rotor mast and coaxial therewith, said rotor mast rotating about a rotor rotating axis,

an upper plate and a lower plate rigid with said central drum and extending substantailly outwards from said drum, said upper and lower plates being axially spaced with one another along said drum,

each said blade being connected by its blade root end to said hub by means of

articulation means consisting in a single laminated spherical stop having a central portion of sandwich structure constituted by an arrangement of rigid part-spherical cups alternating with layers of elastomeric material,

a rigid radial outer fitting having a convex part-spherical surface turned towards said drum and by which it is bonded to said central portion, said outer fitting being fixed to said upper and lower plates and extending between said plates as a rigid cross-piece, and

a rigid radial inner fitting having a concave part-spherical surface turned opposite said drum and by which it is bonded to said central portion, said inner fitting having a slot in its face turned towards said drum, said root end being also connected to said hub by means of a resilient-return drag brace having an inner and an outer end connected by ball and socket joints respectively to said hub and to said root end, the center of the ball and socket joint at said outer brace end being adjacent to the flap axis of the corresponding blade that passes through the center of said laminated spherical stop,

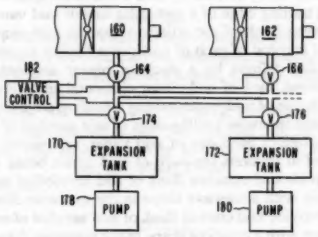
wherein said root end comprises a rigid loop integral with said resistant frame of the corresponding blade, said rigid loop extending between said upper and lower plates and continuously round the corresponding laminated spherical stop, and being engaged and retained in said slot of said spherical stop inner fitting.

4,504,194

AIR LOCK VACUUM PUMPING METHODS AND APPARATUS

Scott C. Holden, Manchester, Mass., assignor to Varian Associates, Inc., Palo Alto, Calif.

Filed May 24, 1982, Ser. No. 381,289
Int. Cl.³ F04B 37/14
U.S. Cl. 417—48 **4 Claims**



1. Apparatus for high speed, intermittent vacuum pumping of plural enclosures, said apparatus comprising:

a plurality of vacuum pumping stages, each comprising

a stage vacuum valve having one port coupled to an interconnection manifold,

an expansion tank coupled to the other port of said stage vacuum valve, said tank having a volume larger than the volume of each of said enclosures and

a vacuum pump coupled to said expansion tank and operative to pump gas from said expansion tank;

a first isolation vacuum valve having one port coupled to said interconnection manifold and the other port coupled to a first one of said enclosures;

a second isolation vacuum valve having one port coupled to said interconnection manifold and the other port coupled to a second one of said enclosures; and

control means operative, when evacuation of a selected one of said enclosures is desired, to open the isolation valve associated with said selected enclosure and to open each

of said stage vacuum valves sequentially for a predetermined time sufficient for substantial equalization of pressure in said selected enclosure and said expansion tank and to close each of said stage vacuum valves before the succeeding stage vacuum valve is opened, such that each selected enclosure is evacuated principally by rapid expansion of the gas therein into each of said expansion tanks rather than by direct operation of the vacuum pumps,

whereby, high speed evacuation of plural enclosures is provided by time-shared operation of said vacuum pumping apparatus.

4,504,195

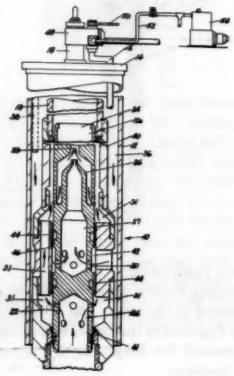
JET PUMP FOR OIL WELLS

Richard H. Binks, Fullerton, and Frederick C. Christ, Long Beach, both of Calif., assignors to Armco Inc., Middletown, Ohio

Continuation-in-part of Ser. No. 279,086, Jun. 30, 1981, abandoned. This application Jun. 20, 1983, Ser. No. 506,000

Int. Cl.³ F04F *5/00*

U.S. Cl. 417—172 **7 Claims**



1. In a fluid operated free pump system, the combination of: supply and production tubings set in a well and connected at their lower ends to a housing, said housing having an area of reduced diameter; a fluid operated free pump unit, including a fluid operated jet pump, said pump unit being movable downwardly through said production tubing to said area of reduced diameter and being maintained at said area of reduced diameter by the forces of gravity and friction between said pump unit and said area of reduced diameter and being operable in said housing by operating fluid under pressure from said supply tubing to discharge production fluid into said production tubing; and a cavity at the lower end of said pump unit, said cavity being located between two balanced seals and communicating with said supply tubing and with said fluid operated pump, power fluid introduced into said cavity causing no net force to be exerted on said pump unit, whereby when pumping action takes place, produced fluids are taken from a lower pressure area below said pump unit and boosted to a higher pressure area above said pump unit, resulting in a net downward force on said pump unit to cause said pump unit to be restrained against said area of reduced diameter.

4,504,196

ROTARY TURBOENGINE AND SUPERCHARGER

Joachim E. Lay, 5371 Wild Oak Dr., East Lansing, Mich. 48823

Filed Dec. 20, 1982, Ser. No. 451,496

Int. Cl.³ F04B *17/00, 35/00*

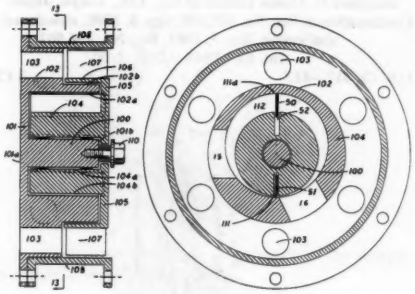
U.S. Cl. 417—355 **8 Claims**

1. In a turbine having a stator member and a turbine member rotatable on an axis inside the stator member with turbine blades mounted around the outside of the turbine member, wherein the turbine has a fluid inlet through the stator member to the blades and a fluid outlet from the blades and wherein the inlet and outlet are parallel to the axis of rotation of the turbine member and are on either side of the blades so that fluid flow in the outlets rotates the turbine member the improvement which comprises:

providing a fluid compressor section inside the turbine as parts of the stator member and the turbine member including:

(a) a rotor means **(30, 104)** on the axis as part of the turbine member with at least one rotor blade means **(50, 51)** which moves in the rotor means in a slot perpendicular to the axis; and

(b) a tubular extension **(13, 102)** of the stator member having



an inside surface **(13*a*, 102*a*)** around the rotor means forming a first chamber having a line of minimum eccentricity across the surface parallel to the axis and an outside surface such that the rotor blade means engages the surface to define adjacent first and second chambers, wherein inlet and outlet openings **(15, 16)** leading outside of the turbine are provided through the inside and outside surfaces of the extension on either side of the line of minimum eccentricity to provide fluid to and from as the rotor means is rotated from the first and second chambers;

wherein in operation of the turbine the rotor means and rotor blade means are rotated together in the extension to compress and drive the fluid between the opening on one side of the extension to the first and second chamber and from the chambers to the opening on the other side of the extension as a compressed fluid.

4,504,197

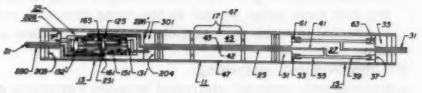
PUMPING UNIT AND REVERSING VALVE AND METHOD OF OPERATING

Carl D. Russell, Box 334, Sallisaw, Okla. 74955

Filed Dec. 3, 1981, Ser. No. 327,065

Int. Cl.³ F04B *17/00*

U.S. Cl. 417—404 **23 Claims**



1. The method of reversing the flow of non-compressible pressure fluid for a piston in a cylinder comprising the steps of:

providing a movable valve means in the piston to alternate exhaust and application of pressure fluid to opposite ends of the piston;

establishing a pair of fluid isolated from each other collaps-

ible chambers for high pressure fluid within the outer ends of said valve means by using a pair of unconnected spaced apart pistons respectively closing said chambers;

driving the piston to the end of a stroke by applying high pressure fluid to one end thereof and exhausting low pressure fluid from the other end;

collapsing one of said chambers at the end of one stroke by stopping its piston while preventing the opposite chamber from collapsing by a rigid member extending axially of the valve means between the two pistons; and,

expanding the collapsed member to move the valve means by allowing the opposite chamber to collapse.

4,504,198

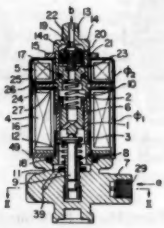
ELECTROMAGNETIC PUMP

Akira Toyoda, and Yasutsune Chiba, both of Tokyo, Japan, assignors to Taisan Industrial Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 185,359, Sep. 8, 1980, abandoned. This application Jan. 7, 1983, Ser. No. 456,502

Int. Cl.³ F04B *17/04, 7/00*

U.S. Cl. 417—417 **3 Claims**



1. In an electromagnetic pump of the built-in electromagnetic valve type and having:

an electromagnetic plunger mounted for slidable reciprocatory movement in a plunger case of non-magnetic material while being supported in balanced condition by the biasing forces of a return spring and an auxiliary spring;

an electromagnetic pump actuating coil disposed in enclosing relation to said plunger case for producing a magnetic flux acting on said electromagnetic plunger through an upper annular magnetic path and an annular magnetic pole;

an electromagnetic movable member disposed in a discharge coupling connected to upper part of said upper annular magnetic path for operating an electromagnetic valve for opening and closing a discharge valve for opening and closing a discharge port of said electromagnetic pump; and,

an electromagnetic valve operating coil enclosing said discharge coupling magnetically associated with said electromagnetic movable member and disposed coaxially with said electromagnetic pump actuating coil in adjacent relation thereto for producing a magnetic flux acting on said electromagnetic movable member through a magnetic washer, said upper annular magnetic path and said annular magnetic pole, said electromagnetic valve operating coil have turns wound in the same direction and is connected in series with said electromagnetic pump actuating coil;

the improvement comprising:

a non-magnetic material interposed between a magnetic path of said electromagnetic pump actuating coil and a magnetic path of said electromagnetic valve operating coil to form two separated magnetic loops which are associated with said coils respectively and opposed to each other along said non-magnetic material for nulifying the residual magnetism in order to prevent the leakage of liquid while the pump is at standstill; and,

a reduced cross-sectional area portion formed by a groove provided on the outer-periphery of said upper annular magnetic path in a position adjacent to said non-magnetic material to increase the magnetic resistance of said upper path and to increase the separation between the upper and lower loops in order to decrease the mutual interference of magnetic fluxes generated by said coils.

4,504,199

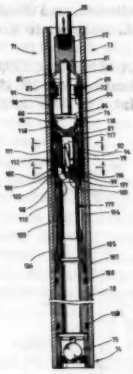
FLUID PUMP

Harry L. Spears, 6307 Glenhill, Spring, Tex. 77379

Filed Apr. 21, 1983, Ser. No. 487,287

Int. Cl.³ F04B *21/02, 39/08*

U.S. Cl. 417—456 **51 Claims**



1. A fluid pump, comprising:

an elongate housing having upper and lower ends;

first valve disposed in the lower end of the housing;

a second valve disposed in the upper end of the housing and slideably mounted for longitudinal movement with respect to the housing;

a third valve, disposed between the first and second valves, including a rotatable valve member having an upper end with a sealing surface thereon and a seating surface in sliding and wiping engagement with the sealing surface;

a piston for compressing fluid, slideably mounted for longitudinal movement with respect to the housing and disposed within the housing between the first and third valves, the space within the housing between the first and third valves defining a variable volume working chamber; and

means for rotating the third valve about its longitudinal axis, said means for rotating being associated with the second and third valves, whereby the longitudinal movement of the second valve causes rotational movement of the third valve.

4,504,200

MINIATURE INFUSION PUMP

Raymond G. Olson, Niles, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Dec. 17, 1979, Ser. No. 104,407

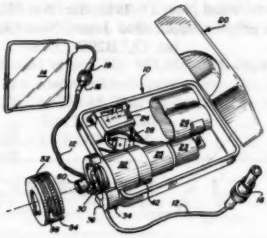
Int. Cl.³ F04B *43/12, 45/08*

U.S. Cl. 417—476 **20 Claims**

1. In a pressure pump for pumping fluids through flexible tubing which comprises a pressure member of generally circular periphery, adapted for orbital motion about an axis of rotation, and a sleeve member positioned about the pressure member and defining channel means for receiving and retaining said flexible tubing in a predetermined position between the pressure member and sleeve member, with the tubing sur-

rounding said pressure member, the improvement comprising, in combination:

said sleeve member being divided into a pair of substantially semi-circular jaws attached together at one end in hinged relation, to permit opening and closing of said jaws about said pressure member to facilitate installation of said tubing, said jaws defining opposed axial faces, one of said faces defining a tubing inlet slot extending transversely thereacross and the other of said opposed axial faces defining a tubing outlet slot extending transversely thereacross, said slots being circumferentially spaced from each other



about said jaws by at least 30°, said pressure member and sleeve member being carried by a housing, said housing being carried by an openable casing adapted to receive a flexible liquid container having flexible tubing for connection through said pressure pump, the pressure member and jaws projecting from said casing toward the exterior, a longitudinal groove defined in said housing to receive said flexible tubing, said tubing inlet slot being positioned on the side of said jaws that faces said casing, an end of said tubing inlet slot being positioned adjacent to the outer end of said longitudinal groove, to permit tubing in said longitudinal groove to pass into said inlet slot.

4,504,201

MECHANICAL PUMPS

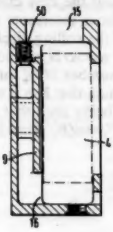
Henryk Wycliffe, Crawley, England, assignor to The BOC Group plc, London, England

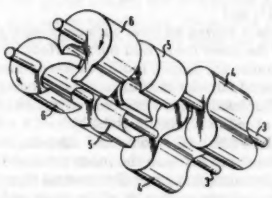
Filed Nov. 22, 1982, Ser. No. 443,506

Int. Cl.³ F01C *1/30*

U.S. Cl. 418—3 **9 Claims**

1. A mechanical pump comprising a pumping chamber having an inlet and an outlet for the passage therethrough of a compressable fluid to be compressed and pumped; a pair of parallel shafts extending through the pumping chamber, each shaft supporting for rotary movement therewith in tandem at least two rotors of the intermeshing "claw" type, each rotor forming one of a complementary pair, each complementary pair occupying an individual location in the pumping chamber, adjacent locations being separated by a partition having an opening which permits the passage of the compressable fluid directly from one location to the next adjacent location, each rotor of the complementary pair in one location being mounted





on its shaft in reverse orientation to the rotors of the complementary pair in the adjacent location.

4,504,202

SINTERED ROTOR FOR A ROTARY PUMP AND A MANUFACTURING METHOD FOR THE ROTOR

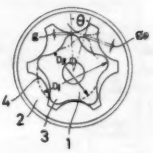
Yasuyoshi Saegusa, Hyogo, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

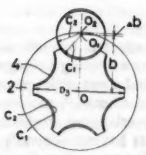
Filed Dec. 9, 1982, Ser. No. 448,503

Claims priority, application Japan, Jul. 23, 1982, 57-129448

Int. Cl.³ F04C *2/10*; B22F *5/08*

U.S. Cl. 418—150 **2 Claims**





1. A rotary pump comprising:

a. an inner rotor having an outer surface defined by the curve generated by the locus of the periphery of a tracking circle of diameter C centered on a closed trochoidal curve when the tracking circle is moved along the closed path defined by the entire trochoidal curve, the trochoidal curve being generated by the locus of a point a distance e

from the center of a rolling circle of diameter B when the rolling circle is rolled on the outside of a base circle of diameter A around the base circle a sufficient number of times that the locus intersects the position of the point where rolling of the rolling circle is initiated, wherein the ratio n given by $n=A/B$ is a non-integer, said outer surface defining a number N of inner rotor teeth equal to a multiple K of n such that K·n is an integer, the magnitudes of e, A, B and n being such that if the eccentricity ratio is represented by $f_e=e/B$, then f_e satisfies the following inequality:

$$0<f_e<f_d(n),$$

where

$$f_d(n)=a_0+a_1/n+a_2/n^2+a_3/n^3+a_4/n^4,$$

where $a_0=0.5$, $a_1=1.434$, $a_2=-19.79$, $a_3=51.02$ and $a_4=-33.11$; and

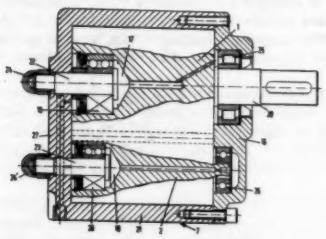
b. an outer rotor having an inner surface engaging the outer surface of the inner rotor, said outer surface having more than N circular arc-shaped tooth portion defined by more than N spaced circular arcs of radius c, c being given by $c=C/2-\Delta c$, inside of and centered on the circumference of a circle of radius b, b being given by $b=(A+B)/2+\Delta b$, where $|\Delta b|+|\Delta c|<0.3$ mm, and $\Delta b>\Delta c$, whereby a combinational gap between the inner rotor and the outer rotor can be maintained generally constant throughout the overall circumference of each of the inner and outer rotors as the inner rotor is eccentrically rotated in the outer rotor.

4,504,203

APPARATUS ADAPTED FOR USE AS A SCREW COMPRESSOR FOR MOTOR

Berend J. Bloemendal, Emmen, and Marinus J. Grootte Bromhaar, Hengelo, both of Netherlands, assignors to Delta Screw Nederland B.V., Emmen, Netherlands

Filed Jan. 18, 1983, Ser. No. 458,773
Int. Cl.³ F04C 2/24
U.S. Cl. 418—201 **7 Claims**



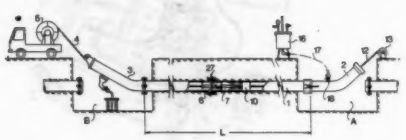
1. Apparatus adapted for use as a screw compressor or motor, comprising a housing having a side wall, two end walls, a gas inlet port and a gas outlet port; at least two cooperating rotors of unequal diameters mounted for rotation in at least two, partially overlapping, right cylinders enveloping said rotors, said rotors having sidewalls with helical profiles, the rotor of the smaller or smallest diameter having a substantially concave helical profile, which, as viewed in perpenicular cross-section, is formed as substantially equal, pit-shaped depressions; the helical profile of the other rotor being substantially convex and rotation-symmetrical of a two- or more-sided shape with outwardly-curved flanks, characterized in that, as viewed in perpendicular cross-section, each of the pit-shaped depressions of the rotor having the smaller or smallest diameter has flanks going from each of the two points of intersection with the circumference of a circle circumscribing said rotor having the smaller or smallest diameter to the bottom of the depression, said flanks being of epitrochoidal configuration, and that, as viewed in perpendicular cross-section, each of the outwardly-curved flanks of the other rotor, going in the direction of the two apexes of the flanks, which apexes are located on the circumference of a circle circumscribing said other rotor to the centre, is of epitrochoidal shape.

4,504,204

PIG FOR REPAIRING INTERIOR PORTIONS OF A PIPELINE

Motoyuki Koga, Tokyo, Japan, assignor to Hakko Co., Ltd., Tokyo, Japan

Filed Nov. 17, 1983, Ser. No. 552,657
Claims priority, application Japan, Nov. 19, 1982, 57-204377
Int. Cl.³ B29D 23/08
U.S. Cl. 425—11 **5 Claims**



1. A pig for repairing interior portions of a pipeline with resin comprising;

a cylindrical portion diameter of which is slightly smaller than the inner diameter of the pipeline so as to allow the moving of the pig in the pipeline;

at least one introduction portion which is formed by reducing a rear portion of said cylindrical portion; and

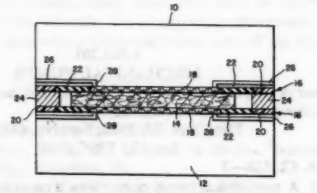
at least one discharge passage formed in said cylindrical portion, said discharge passage being axially disposed and overlapped with said introduction portion interposing a periphery portion of said cylindrical portion and opened to the front of said cylindrical portion, whereby resin in the rear side of the pig can be discharged to the front side passing through the periphery portion and discharge passage.

4,504,205

APPARATUS FOR CONVERTING A CONDUCTION PRESS FOR CONSOLIDATION OF PRODUCTS BY HEAT AND PRESSURE TO A CONVECTION PRESS

John Stofko, St. Charles, Ill., assignor to Carbocol Inc., Beaverton, Oreg.

Filed Sep. 28, 1982, Ser. No. 426,423
Int. Cl.³ B29C 15/00
U.S. Cl. 425—181 **10 Claims**



1. A kit apparatus for converting a conduction press for consolidation of products by heat and pressure to a convection press therefor; wherein said conduction press comprises a frame, upper and lower press platens supported by said frame, means for moving said platens relative to each other, and means for heating said platens with heating fluids; said kit comprising a pair of caul plates, a first for use in conjunction with said upper press platen and a second for use in conjunction with said lower press platen, each said caul plate having a

central area which is permeable to steam both horizontally and vertically and a fluid impermeable edge area circumferentially surrounding said central permeable area; sealing means for inhibiting the escape of steam from the central permeable area operatively associated therewith; means for attaching said first caul plate to said upper platen; and means for providing for the feeding of steam to said central permeable area, so that said conduction press platens remain in place after conversion.

4,504,206

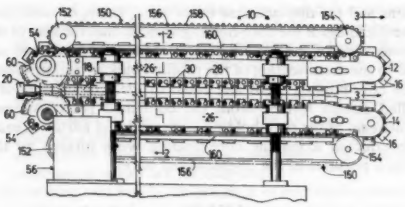
CHAINLESS MOLD DRIVE FOR A CORRUGATOR OR THE LIKE

Manfred A. A. Lupke, 35 Ironshield Cresc., and Gerd P. H. Lupke, 46 Stornoway Cresc., both of Thornhill, Ontario, Canada

Continuation-in-part of Ser. No. 341,556, Jan. 21, 1982, abandoned, which is a continuation-in-part of Ser. No. 186,625, Sep. 12, 1980, Pat. No. 4,325,685. This application Jan. 12, 1983, Ser. No. 457,285

Int. Cl.³ B29D *23/03, 23/04*

U.S. Cl. 425—326.1 **1 Claim**



1. A thermoplastic tube producing apparatus having a means defining a mold cavity comprising at least one train of mold sections including an endless train of circulating independent mold sections travelling in an endless path comprising a straight forward run wherein said sections co-operate to form a travelling mold for the thermoplastic tube, a return run, two semi-circumferential guide tracks for transferring said sections between said runs, track engaging means on each mold section for engaging said tracks so as to support and guide the sections along the tracks, said mold sections being provided with at least one pair of opposed rollers, in the center of said semi-circular tracks a rotatable transfer means being installed and including a pair of opposed sprockets mounted on a shaft and meshing with said pair of rollers to avoid jamming, high bearing loads and wear in said semi-circumferential guide tracks, characterized in that between said sprockets a rotor is mounted on said shaft and the mold sections are provided with a guide means operatively engaging with said rotor to ensure transverse alignment of the mold sections.

4,504,207

PRESSING APPARATUS FOR MAKING PARTICLEBOARD

Dieter K. Arnold, Darmstadt, Fed. Rep. of Germany, assignor to Carl Schenck AG., Fed. Rep. of Germany

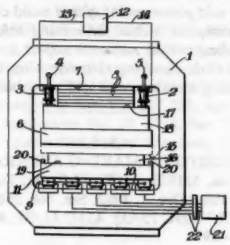
Filed May 14, 1982, Ser. No. 378,280

Claims priority, application European Pat Off., May 23, 1982, 81103987

Int. Cl.³ A01J *21/00*

U.S. Cl. 425—385 **4 Claims**

1. In a press for the production of particleboard from a preformed mat of wood particles and a suitable binder, the press having spaced apart frames aligned one after the other and first and secnd parallel press platens movable toward and away from each other, the improvement comprising motivating means connected between the first press platen and at least some of the frames for moving the first press platen to an extended position toward the second platen and against the preformed mat to thereby close the press, support structure between the press frames and the first press platen for maintaining the first platen at its extended position while preventing bending or arching thereof, and actuator means connected between the press frames and the second press platen for moving the second platen toward the first platen and against the preformed mat while maintaining the second platen substantially parallel to the first to thereby press the preformed mat.



4,504,208

MOLD CLAMPING DEVICE FOR INJECTION MOLDING MACHINE

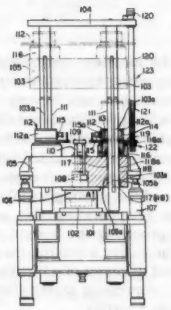
Masanobu Kurumaji; Naoki Takeuchi; Hiroaki Kondo, all of Kobe; Toshiaki Akita, Amagasaki; Tsutomu Sano, and Katsumi Sugano, both of Kobe, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Jul. 13, 1983, Ser. No. 513,387

Claims priority, application Japan, Jul. 14, 1982, 57-123514; Oct. 1, 1982, 57-173783; Oct. 1, 1982, 57-173782

Int. Cl.³ B29F *1/00*

U.S. Cl. 425—589 **7 Claims**



1. (Amended) A mold clamping device for an injection molding machine wherein a movable table which supports a movable mold is moved in directions approaching and moving away from a fixed table which supports a fixed mold to thereby bring the molds into open and closed states [,]· [and wherein mold clamping is effected in a closed state of the molds by means of] *comprising:*

a plurality of mold clamping cylinders, *each mold clamping cylinder having a cylinder and piston means positioned in said cylinder,* [said mold clamping device comprising:] *wherein mold clamping is effected in a closed state of the mold clamping cylinder;*

a plurality of tie rods for guiding movement of said movable table, said tie rods projecting upwards from *and being immovably fixed with respect to* said fixed table and each having an engaging groove formed on an outer peripheral surface of a portion thereof projecting from said movable table to a side opposite [to] said fixed table in said closed state of the molds; [and]

a plurality of mold opening/closing cylinders fixed to said base; and

a plurality of split mold-like locking members *provided on said piston of said mold clamping cylinders* for engaging

with and disengaging from said tie rods through each said engaging groove, respectively, of said plurality of tie rods in said closed state of the molds, said locking members being slidable in an axial direction of said tie rods, wherein said *piston means of said* mold clamping cylinders *further comprise means for moving said locking member axially along said tie rods with respect to said movable table and said mold clamping cylinders being* disposed between said locking members and said movable table.

4,504,209

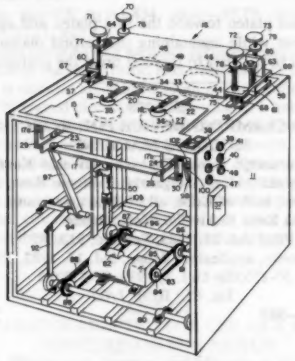
TORTILLA MAKING APPARATUS

Louis C. Skloss, 4319 Irene, San Antonio, Tex. 78222

Filed Dec. 1, 1983, Ser. No. 556,838

Int. Cl.³ B29C *15/00*; A21C *11/00*; A21B *5/00*

U.S. Cl. 425—397 **11 Claims**



1. An apparatus for molding tortillas comprising:

a first compressing means having a flat compressing surface;

a second compressing means having a flat compressing surface which is reciprocally mounted with the first compressing means for molding a tortilla between the surfaces;

feeding means reciprocally mounted with the first surface means for feeding dough to be compressed by the first and second means and for ejecting tortillas therefrom;

drive means for reciprocating the second compressing means and reciprocating the feeding means; and

the drive means including adjusting means to predetermine the thickness and diameter of a tortilla and the dwell time of the second compressing means after a ball of dough is flattened to form a tortilla.

4,504,210

DIE FOR EXTRUDER

Siegfried Titz, Hennef; Matthias Langel, Troisdorf-Spich; Waldemar Wissinger, Siegburg, and Josef Kurth, Troisdorf, all of Fed. Rep. of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Fed. Rep. of Germany

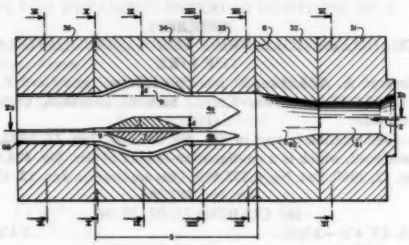
Filed May 6, 1983, Ser. No. 492,254

Claims priority, application Fed. Rep. of Germany, May 6, 1982, 3216918

Int. Cl.³ B29F *3/04*

U.S. Cl. 425—461 **8 Claims**

1. A die operatively associated with an extruder and provided with an inwrought flow channel which comprises a die housing having internal surfaces defining said flow channel and displacement cores for shaping a plasticized synthetic resin bulk stream into a shaped profile having a cross-section provided with hollow chambers, said die housing comprising several die members joined together to define said flow channel and the displacement cores in the flow channel being connected to at least one member of the die housing by way of core-holding webs that separate the flow channel thus subdividing a profiled bulk stream into partial streams, the combined cross-sections of the partial streams being equal to the cross-section of the undivided profiled bulk stream, at least one of the die members cooperating with the displacement cores so that the bulk stream received from the extruder is shaped into the profiled bulk stream having a cross-section substantially corresponding to said shaped profile, the displacement cores having surfaces that subdivide the profiled bulk stream upstream of the zone of the core-holding webs into said partial



streams and the displacement cores being enlarged according to the thickness of the core-holding webs so that the sum of the cross-sections of the partial streams remain the same and are equal to the cross-section of the profiled bulk stream upstream of the core-holding webs and equal to the cross-section of a profiled stream formed from the combined partial streams downstream of the core-holding webs, and said partial streams are conducted along the core-holding webs formed by the enlarged portions of the displacement cores.

4,504,211

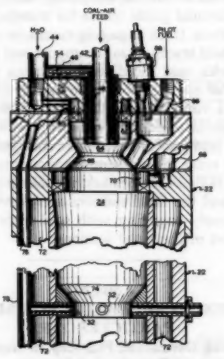
COMBINATION OF FUELS

David H. Beardmore, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 2, 1982, Ser. No. 403,983

Int. Cl.³ F23J *7/00*

U.S. Cl. 431—3 **11 Claims**



1. A method of burning a fuel, containing significant amounts of NO_x precursors, comprising:

(a) passing said fuel through at least four serially connected combustion zones in open communication with one another, including, at least three fuel-rich zones and a last fuel-lean zone;

(b) adding a first volume of combustion-supporting material adjacent the upstream end of the first of said fuel-rich zones and intimately mixing the thus added first volume of combustion-supporting material with all of said fuel adjacent said upstream end of said first of said fuel-rich zones;

(c) adding an additional volume of combustion-supporting material adjacent the upstream end of each of the remaining fuel-rich zones and intimately mixing the thus added

additional volume of combustion-supporting material with effluent from the immediately preceeding fuel-rich zone adjacent said upstream end of each of said remaining fuel-rich zones;

(d) the total combustion-supporting material thus added to the upstream ends of said first fuel-rich zone and said remaining fuel-rich zones, together with said fuel, resulting in a fuel/combustion-supporting material equivalence ratio greater than 1.0;

(e) adding a still further volume of combustion-supporting material adjacent the upstream end of said fuel-lean zone and intimately mixing the thus added still further volume of combustion-supporting material with effluent from the last of said fuel-rich zones adjacent said upstream end of said fuel-lean zone;

(f) the total combustion-supporting material thus added to the upstream ends of said first fuel-rich zone, said remaining fuel-rich zones and said fuel-lean zone, together with said fuel, resulting in a fuel/combustion-supporting material equivalence ratio less than 1.0;

(g) providing an outlet from each combustion zone of substantially less cross-sectional area than the cross-sectional area of the beginning of the next succeeding combustion zone and abruptly terminating more fuel-rich combustion adjacent the downstream end of each of a preceeding one of said combustion zones and initiating less fuel-rich combustion adjacent the upstream end of each of an immediately succeeding one of said combustion zones, at least in part, by thus adding combustion-supporting material to the effluent of said preceeding one of said combustion zones as a plurality of radial jets toward the center of said combustion zone, whereby at least four clearly defined combustion zones are formed; and

(h) burning said fuel in the presence of said combustion-supporting material in a serial manner in said at least four combustion zones.

4,504,212

CONTROL APPARATUS FOR DENTAL GAS BURNER

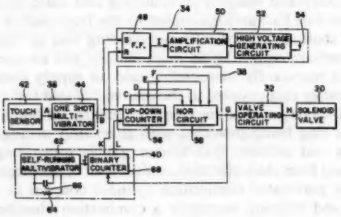
Yoshikazu Tada, Tokyo, Japan, assignor to Hayashikane Shipbuilding & Engineering Co. Ltd., Yamaguchi, Japan

Filed Dec. 16, 1983, Ser. No. 562,140

Claims priority, application Japan, Jul. 26, 1983, 58-115147[U]

Int. Cl.³ F23N *5/00*

U.S. Cl. 431—86 **8 Claims**



1. A control apparatus for a dental gas burner, comprising:

a valve operating circuit for operating an solenoid valve provided at a fuel gas supply pipe connected to nozzle of said gas burner;

an ignition circuit for igniting fuel gas ejected from said burner nozzle;

a command circuit including a touch sensor, said command circuit being adapted to generate a pulse every time when an operator touches said touch sensor;

a combustion time setting circuit which is adapted to count said pulses generated from said command circuit to set combustion time corresponding to the number of counted pulses and supply a signal for opening said solenoid valve to said valve operating circuit; and

a timing circuit for supplying to said combustion time setting circuit a count signal required for counting the number of pulses after said solenoid valve is opened.

4,504,213

FUEL INLET ASSEMBLIES FOR FUEL REACTORS

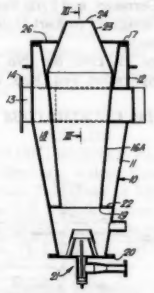
Gerardus A. Markus, S/Gravenzande, Netherlands, assignor to BS&B Engineering Company Inc., Houston, Tex.

Continuation of Ser. No. 524,110, Aug. 14, 1983, abandoned, which is a continuation of Ser. No. 257,205, Apr. 24, 1981, abandoned. This application Jul. 18, 1984, Ser. No. 631,525

Claims priority, application United Kingdom, Jun. 27, 1980, 8019827

Int. Cl.³ F23D *13/40*

U.S. Cl. 431—116 **6 Claims**



1. In a fuel reactor comprising an inner shell mounted coaxially within an outer shell with an annular space therebetween, the outer shell having a closed end at one axial end of the reactor and the inner shell having at one end thereof a discharge nozzle extending through said closed end of the outer shell, a fuel inlet assembly mounted at the other end of said outer shell, the inner shell having an open end opposite to the end having the discharge nozzle, said open end being spaced axially from said fuel inlet assembly and said open end also being spaced radially from said outer shell to provide an opening from the annulus between the inner and outer shells, the outer shall having an inlet for blowing combustion air substantially tangentially into the annular space between the inner and outer shells and through the opening from the annular space to cause said combustion air to swirl axially from the annulus into the space within the outer shell between the open end of said inner shell and the other end of said outer shell, said fuel inlet assembly comprising, in combination:

A. a base plate mountable to close said other end of the outer shell;

B. a fuel inlet aperture in said base plate;

C. a first frusto-conical inlet cone mounted directly on said base plate to surround said fuel inlet aperture and with the wider end of the cone adjacent to the base plate;

D. a second frusto-conical inlet cone; and

E. a plurality of circumferentially spaced vanes extending between said first and second cones in substantially radial planes with respect to the axis of said first cone, said second cone being mounted coaxially with, spaced from and in partly overlapping relation to the first cone to provide an annular pre-mix combustion air conduit between said first and second cones, the wider end of the second cone facing the base plate and being axially spaced therefrom; the pre-mix combustion air conduit having an inlet opening at the wider end of the second cone for substantially axial, but convergent, flow of pre-mix combustion air into said conduit, the narrower ends of said first and second cones being spaced from one another to provide an opening from said conduit at the narrower end of said first cone, whereby a portion of the combustion air

passes between said circumferentially spaced vanes to cause said portion of air to flow in an oriented axial direction substantially without swirl through said annular premix combustion air conduit into the second cone for premixing with the fuel entering the second cone and whereby the remainder of the combustion air mixes with the fuel on the side of said second cone remote from said plate, to provide fuel-air mixing needed for good combustion characteristics and relatively low noise levels.

4,504,214

CONTROL VALVE FOR A BURNER WITH SHUTOFF CHARACTERISTICS

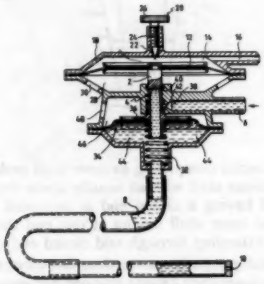
Karl-Heinz Stahl, Zum Felchen 20, D-7770 Überlingen/Nussdorf, Fed. Rep. of Germany, and Fritz Fend, Lappersdorf, Fed. Rep. of Germany, assignors to Karl Heinz Stahl, Uberlingen, Fed. Rep. of Germany

Filed Dec. 29, 1981, Ser. No. 335,386

Claims priority, application Fed. Rep. of Germany, Jan. 9, 1981, 3100414

Int. Cl.³ F23D *11/38*

U.S. Cl. 431—121 **5 Claims**



1. A valve assembly for controlling delivery of an active substance to a burner in response to a fluid signal which is indicative of burner operation comprising:

inlet means through which said active substance is delivered to said valve assembly;

outlet means for delivering said active substance to said burner from said valve assembly, said outlet means including a discharge chamber through which said active substance flows;

a valve mechanism interposed between said inlet means and said outlet means including a valve member movable to open and close said valve mechanism to control the flow of said active substance therethrough;

a first diaphragm affixed to said valve member and movable therewith to control movement thereof to open and close said valve mechanism in response to a fluid signal;

fluid delivery means adapted to enable delivery to said first diaphragm of a fluid signal for controlling operation of said valve mechanism, said first diaphragm being arranged to effect movement of said valve member to open and close the valve mechanism in response to said fluid signal;

a second diaphragm affixed to said valve member and movable together therewith, said second diaphragm having said discharge chamber arranged contiguously therewith on one side thereof and being operable, upon movement of said valve member in a direction to close said valve mechanism, to enlarge the volume of said discharge chamber thereby to create a suction effect tending to draw active substance into said discharge chamber away from said burner, and

said valve member comprising a hollow cylindrical slider, and said valve mechanism further comprising means defining an annular distributor space extending externally about said slider, said slider having an opening extending therethrough which is moved into and out of alignment with said annular distributor space to open and close said valve mechanism.

4,504,215

LIQUID FUEL BURNER

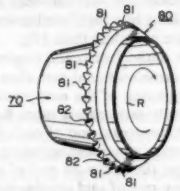
Junichiro Akiyama; Mitsuhiro Tanaka, and Yoshihisa Moriuchi, all of Shizuoka, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Japan

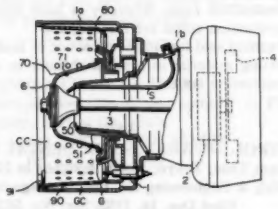
Filed Oct. 6, 1982, Ser. No. 433,147

Claims priority, application Japan, Oct. 9, 1981, 56-161388; Oct. 9, 1981, 56-161389; Oct. 9, 1981, 56-150264[U]

Int. Cl.³ F23D *11/06*

U.S. Cl. 431—168 **15 Claims**





1. An improved liquid fuel burner comprising a hollow cylindrical main body, a rotary main drive shaft concentrically arranged in said main body, an air supply duct coupled to said main body and spatially surrounding said main drive shaft, a conical fuel carburetor coupled to the front end of said main drive shaft and specifically surrounding said air supply duct, said carburetor having an inner surface and an open end arranged rearwardly surrounding said air supply duct, a plate-like scatter ring coupled to the rear end of said fuel carburetor whilst leaving scatter ring gaps for passage of liquid fuel, said scatter ring being provided with alternately arranged scatter guides and cutouts, said scatter guides protruding radially outward from the outermost conical wall of said scatter ring, a hollow perforated combustion cylinder coupled to said main body and defining internally a combustion chamber around said fuel carburetor and externally a gas chamber surrounded by said main body, means for supplying said liquid fuel to said combustion chamber along the inner surface of said carburetor and into contact with said scatter guides for pulverization of said liquid fuel, and means for supplying fresh air to said combustion chamber.

4,504,216

BURNER REGISTER ASSEMBLY

Donald K. Hagar, Emmans, and Lyle D. Geiger, Fogelsville, both of Pa., assignors to Eagleair, Inc., Bethlehem, Pa.

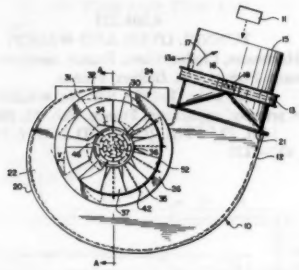
Filed Sep. 15, 1982, Ser. No. 418,434

Int. Cl.³ F23M *9/00*

U.S. Cl. 431—183 **2 Claims**

1. A secondary air supply arrangement for a furnace, comprising:

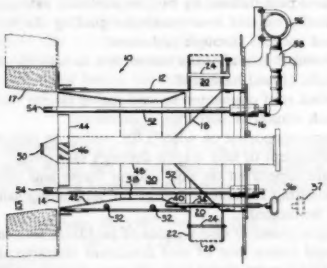
(a) a windbox for supplying secondary air;
(b) a plurality of air register assemblies in said windbox, each air register assembly having an inlet for admitting secondary air from said windbox into the air register assembly and an outlet for discharging secondary air into the furnace, each air register assembly including a scroll section and an air valve, said air valve of each air register assembly being disposed adjacent said inlet and upstream of said scroll section, said scroll section of each air register assembly communicating with said air valve thereof for controlling the flow of secondary air into the furnace, said scroll section of each air register assembly having a scroll passageway which spirals inwardly in the direction of secondary air flow therethrough.



4,504,217
LOW EXCESS AIR BURNER HAVING A MOVABLE VENTURI

Richard E. Winschel, deceased, late of Erie (by Marie A. Winschel, administratrix); Fred B. Heil, Cambridge Springs, and Robert V. Seibel, Erie, all of Pa., assignors to Zurn Industries, Inc., Erie, Pa.

Filed Oct. 14, 1983, Ser. No. 541,889
Int. Cl.³ F23M 9/00
U.S. Cl. 431—183 **20 Claims**

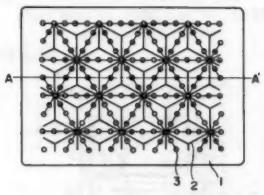


1. A low excess air burner assembly comprising:
a hollow burner housing having a first end and a second end,
the first end being open and adapted to be supported adjacent a refractory throat,
the second end being closed,
means for supplying fluid fuel to the refractory throat,
air access means for introducing air into the burner housing adjacent the second end thereof,
venturi means provided in the burner housing,
air spinner means adjacent the first end of the burner housing,
said venturi means comprising an annular insert formed by a first frustoconical member having a large end and a small end,
a cylindrical member connected to said small end of said first frustoconical member,
a second frustoconical member having a large end and a small end,
the small end being connected to said cylindrical member,
said venturi extending from a position adjacent said air spinner means to a position adjacent said air access means,
means for moving the venturi means through a predetermined range to obstruct air from said air access means thereby reducing the flow of air through said burner to said opening,
said venturi means being adapted to provide a substantially smooth, evenly distributed flow of air from said air access means to said air spinner means which causes turbulent flow of the air thereby providing substantially optimum mixing of the low excess air and fluid fuel in the refractory throat,
one said large end of said venturi means being disposed adjacent said air access means,
said air access means being adapted to admit a smooth evenly distributed flow of air through said venturi to said refractory throat.

4,504,218
CERAMIC BURNER PLATE

Toshihiro Mihara, Hirakata; Takao Kusuda, Ashiya; Koichi Noma, and Hiromitsu Taki, both of Miyazaki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

PCT No. PCT/JP82/00027, § 371 Date Sep. 28, 1982, § 102(e) Date Sep. 28, 1982, PCT Pub. No. WO82/04484, PCT Pub. Date Dec. 23, 1982
PCT Filed Jan. 28, 1982, Ser. No. 433,137
Claims priority, application Japan, Feb. 3, 1981, 56-14826; Feb. 3, 1981, 56-14827; Feb. 3, 1981, 56-14830; Feb. 3, 1981, 56-14831; Feb. 3, 1981, 56-14833; Feb. 3, 1981, 56-14834; Feb. 3, 1981, 56-14835
Int. Cl.³ F23D 13/12
U.S. Cl. 431—326 **6 Claims**



1. A ceramic burner plate comprising a composite ceramic structure of fireclay and ceramic fiber, said ceramic burner plate having a lithium component as a metal oxide for reduction of carbon monoxide in exhaust gases from the burner plate, at 0.1 wt. % to 5 wt. % based on the total weight of the composite ceramic, and at least one component as a metal oxide, at 0.1 wt % to 5 wt. % based on the total weight of the composite ceramic, selected from the group consisting of nickel, manganese, cobalt, titanium, copper, iron, chromium, and vanadium, and said burner plate having a continuous undulating pattern on its surface.

4,504,219
HEATING APPARATUS FOR CIRCULATORY-FIRING OPEN BAKING FURNACES AND PROCESS FOR USE OF THE APPARATUS

Jean-Claude Thomas, L'Argentiere, France, assignor to Aluminium Pechiney, Lyons, France

PCT No. PCT/FR82/00175, § 371 Date Jun. 27, 1983, § 102(e) Date Jun. 27, 1983, PCT Pub. No. WO83/01677, PCT Pub. Date May 11, 1983
PCT Filed Oct. 27, 1982, Ser. No. 515,042
Claims priority, application France, Oct. 29, 1981, 81 20613
Int. Cl.³ F27D 7/00; F27B 7/00
U.S. Cl. 432—4 **7 Claims**

6. A process for heating an open circulatory baking furnace

having a plurality of baking chambers separated by hollow partitions having baffle means therein, said process comprising the steps of:

introducing a combustion supporting gas flow into said hollow partitions and through oppositely directed flow paths defined by said baffle means in each said partition;

injecting a stream of fuel into each said partition in an injection direction and at a position where said injection direction is countercurrent to a direction of a flow of said gas, whereby a length of a flame produced by combustion of said fuel is shortened by said countercurrent gas flow;

positioning a temperature sensing means in each said partition at a location in direct line of sight with said flame; and

controlling combustion as a function of said sensed temperature.

4,504,220

DRYING APPARATUS WITH DEODORIZING SYSTEM FOR A PRINTING MACHINE

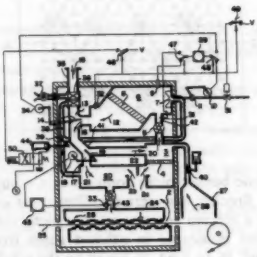
Kiyoshi Sunakawa, Zama, and Shinichi Maruyama, Tokyo, both of Japan, assignors to Toshiba Kikai Kabushiki Kaisha and Netsu Kogyo Kabushiki Kaisha, both of Tokyo, Japan

Filed Apr. 8, 1983, Ser. No. 483,380

Claims priority, application Japan, Apr. 9, 1982, 57-58309

Int. Cl.³ F27B *9/28, 9/40*

U.S. Cl. 432—72 **7 Claims**



1. A drying apparatus with a deodorizing means for a printing machine comprising:

a hot blast nozzle for directing a hot blast against a printed web for drying the printed material;

deodorizing means including a preheating chamber provided with a burner for preheating a collective process gas including a portion of a used process gas already used during drying operation;

a catalytic layer for oxidizing the used process gas;

a fan for supplying the used process gas through the catalytic layer to an outlet conduit for said preheating chamber, said outlet conduit including damper means for dividing a treated process gas, including a hot blast obtained by the treatment with the deodorizing means into two parts and discharging one part of the two parts and a second damper means operatively connected in a returning duct for subdividing the other part into two parts and introducing one part thereof to an odor collective chamber connected to the preheating chamber and introducing the other part to a hot blast mixing chamber into which the other part of the foregoing used process gas is supplied; and

a hot blast circulating blower for supplying a mixture process gas of the treated process gas and the used process gas in the foregoing hot blast mixing chamber to the hot blast nozzle.

4,504,221

TUNNEL OVEN AND WAGON

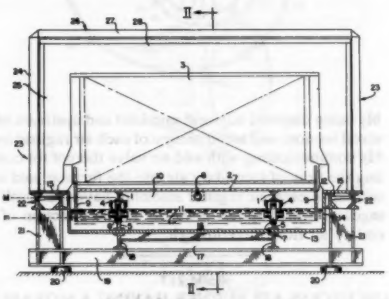
Michel Hartmann, Chalonvillars, France, assignor to Entreprise Hartmann Pere et Fils, Belfort, France

Filed Feb. 14, 1983, Ser. No. 466,315

Claims priority, application France, Feb. 12, 1982, 82 02294

Int. Cl.³ F27B *9/26;* **F27D** *3/12, 1/18*

U.S. Cl. 432—137 **8 Claims**



1. A tunnel oven having a sealing arrangement for providing a substantially sealed closure of a lower face of a treatment chamber of said tunnel oven through which a train of wagons is movable in order to treat products carried thereby in said treatment chamber, said tunnel oven comprising:

a base having a longitudinally extending lower wall and two longitudinally extending elevated lateral walls,

a travel path defined by two parallel rails extending longitudinally on said lower wall for guiding the movement of said wagons through said oven,

two sealed lateral walls connected to said elevated lateral walls of said base, and

a sealed roof connected to said sealed lateral walls,

and each wagon of said train comprising:

a frame supported on wheels for rolling on said rails during movement of said wagon through said oven,

a plate supported on said wagon frame and covered with insulating refractory linings for supporting said products to be treated,

the wagon plates of said wagons of said train forming substantially said lower face of said treatment chamber defined between said wagon plates and said oven lateral walls and roof, during movement of said train through said oven, wherein said sealing arrangement comprises:

a pair of longitudinally extending and substantially upright walls of said oven base, each connecting said base lower wall to one of said base elevated lateral walls and defining therewith a trough containing a liquid, and, for each said wagon,

an endless depending skirt comprising interconnected longitudinally extending and transversely extending metal blades extending downwardly from said wagon plate to such an extent that said skirt present a lower edge which is always immersed in the liquid contained in said trough as said wagon moves through said oven, in order to substantially seal-off a corresponding wagon under-chamber defined by said skirt below said wagon plate from said oven treatment chamber and thereby allow a substantially

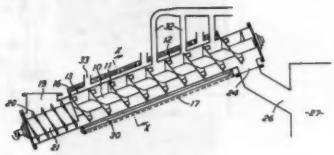
sealed closure of said lower face of said treatment chamber.

4,504,222

SCREW CONVEYER AND FURNACE

Robert F. Christian, San Francisco, Calif., assignor to Jude Engineering, Inc., San Francisco, Calif.

Filed Sep. 13, 1983, Ser. No. 531,700
Int. Cl.³ F26B *9/18;* F23N *5/24*
U.S. Cl. 432—139 **1 Claim**



1. A screw conveyer comprising
(a) a rotary shaft carrying screw flite means surrounding and attached to the shaft
(b) an imperforate tubular housing surrounding at least the major part of the length of the screw flite means
(c) inlet and outlet openings at opposite ends of the housing for products to be heated
(d) an inverted U-shaped heat insulation casing over said housing and spaced therefrom, said casing being open at its under part for inlet of ambient air
(e) a plurality of pipe burners arranged below the housing extending parallel to the axis of the shaft along said major part of the length of the screw flite means
(f) first exhaust duct means (32) connected to the housing and communicating with the interior of the housing for exit of moisture
(g) second exhaust duct means (33) communicating with the space between the housing and the casing for exhausting burnt gases
(h) the shaft, housing and casing are inclined to the horizontal with the inlet opening lowermost
(i) the shaft extends out of the casing at the inlet end and the shaft carries a feed screw at the inlet end outside the casing below the inlet opening
(j) the screw flite carries mixing blades (12)
(k) at least three side pipe burners are provided spaced apart from each other below the housing.

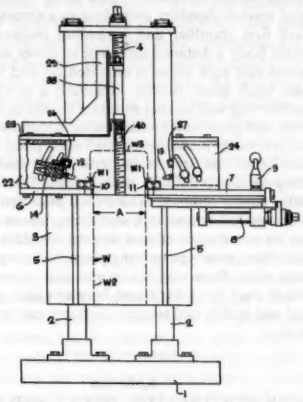
4,504,223

SOLDERING DEVICE FOR RADIATOR TANKS

Kazuo Yamada, Aichi, and Hiroshi Sakaki, Hon, both of Japan, assignors to Ryowa Engineering Company, Limited, Nagoya, Japan

Filed Aug. 18, 1983, Ser. No. 524,757
Int. Cl.³ F27B *9/22*
U.S. Cl. 432—225 **3 Claims**

1. A soldering device for an object having a core section and an extended area, said device comprising
a base,
two frames whose vertical positions with respect to said base are adjustable,
two burner tables forming therebetween a gap with an adjustable interval for inserting said object, said two burner tables being respectively on said two frames,
cooling pipes for passing cooling water therethrough to prevent transmission of heat into said core section, said cooling pipes being disposed respectively on said burner tables, sandwiching said gap therebetween and being in contact with said soldering area of said object,
a plurality of burner nozzles disposed on each of said burner tables, directed generally towards said gap and distributed perpendicularly to said interval and uniformly over a distance no less than the entire width of said extended soldering area, said plurality of burners being divided into several control units so that nozzles belonging to different units can be operated independently of each other,



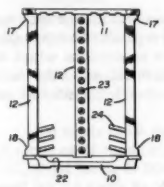
one of more valve means for controlling passage of fuel to one or more of said several units, and
a control means for shifting the times for starting and shutting off the supplying of an oxygen-containing gas from the burner ignition and fire extinction times.

4,504,224

KILN FURNITURE

David K. Hewitt, Victoria Rd., Fenton, Stoke-on-Trent, England ST4 2HR

Filed May 22, 1980, Ser. No. 152,146
Int. Cl.³ F27D *5/00*
U.S. Cl. 432—258 **8 Claims**



1. Kiln furniture comprising:
a setter for holding and supporting articles of refractory or ceramic flatware in spaced and stacked relationship during kiln firing, said setter including
an upper end unit having a plurality of apertures defined therein;
a lower end unit having a top surface and a plurality of second apertures defined therein, said second apertures including a lower section and an upper section, said upper section including a ramp means angled upwardly from said lower section and outwardly of said lower end unit, said upper and lower sections being equally sized except for said ramp means;
a plurality of elongate pillars for detachably connecting said end units together, each pillar including a body portion, a top end portion, a bottom end portion, a plurality of mounting means on said body portion to be spaced apart along said body portion for supporting articles when said setter is assembled, end extensions on said top and bottom ends, said top end extensions being sized and shaped to be

snugly received in said upper end unit apertures and said bottom end extensions being sized and shaped to be loosely received in said aperture lower sections to define a gap, a first shoulder on said pillar bottom end portion and a second shoulder on said pillar bottom end portion, said second shoulder extending in a direction opposite to said first shoulder and extending outwardly from said pillar body a distance sufficient to cover said ramp means when said each pillar is mounted on said lower end unit, said each pillar further including a pivot ramp means connecting said second shoulder to said bottom end extension, said pivot ramp means being juxtaposed to said upper section ramp means when said each pillar is mounted on said lower end unit to cooperate with said upper section ramp means to define a tilting means for tilting said each pillar during removal of said each pillar from engagement with said lower end unit, said tilting means further including an outer edge of said second shoulder and said gap, said tilting means permitting progressive separation of said each pillar from said lower end unit whereby any glaze which may have hardened between said each pillar and said end unit in said second apertures can be progressively broken.

4,504,225

ORTHODONTIC TREATING DEVICE AND METHOD OF MANUFACTURING SAME

Osamu Yoshii, 4-2-11, Fujimi-cho, Chofu-shi, Tokyo, Japan

Continuation of Ser. No. 845,619, Oct. 26, 1977,. This application Sep. 13, 1983, Ser. No. 531,558

Claims priority, application Japan, Nov. 5, 1976, 51-132323

Int. Cl.³ A61E *7/00*

U.S. Cl. 433—6 **3 Claims**

1. A silicone resin orthodontic treating device for the complete treatment of a patient's teeth, said device having upper and lower negative impressions which duplicate the patient's upper and lower teeth and move the teeth to a desired position during treatment, wherein the silicone resin material has properties including:

hardness of about 40 to about 60,

tensile strength of about 85 to about 130 kg/cm^2,

strain of about 400 to about 560%,

molecular weight of about 6×10^5 (base silicone), and

200% modulus of about 35 to about 45 kg/cm^2.

4,504,226

METHOD AND APPARATUS FOR POSITIONING MAXILLARY AND MANDIBULAR ARCH MODELS FOR FORMING A GNATHOLOGICAL POSITIONER

Woodford W. Gordon, 125 Miraloma Dr., San Francisco, Calif. 94127

Filed Mar. 18, 1982, Ser. No. 359,377

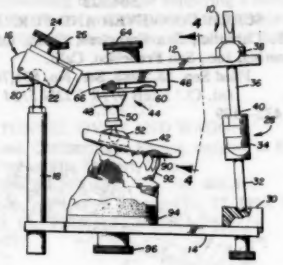
Int. Cl.³ A61C *11/00*

U.S. Cl. 433—63 **9 Claims**

5. In an articulator having a first mounting portion, a second mounting portion, and means for hingedly securing said first portion to said second portion in a spaced apart relationship, the improvement comprising:

an occlusal guide plane; and

means for detachably mounting said occlusal guide plane to one of said first mounting portion and said second mounting portion and for selectively positioning said occlusal guide plane between said first portion and said second portion, the other of said first portion and said second portion having an arch model mounted thereto, said occlusal guide plane being three dimensionally adjustable to a plane of occlusion of said arch model such that it is



capable of horizontal and vertical sliding movement and angular rotation relative to said first and second mounting portions.

4,504,227

DENTAL HANDPIECE SET

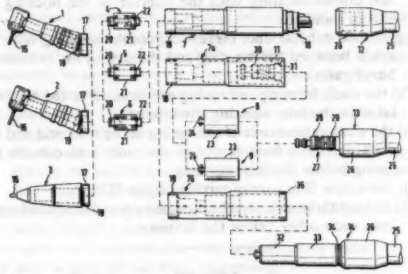
Gerd Löhn, Biberach, Fed. Rep. of Germany, assignor to Kaltenbach & Voight GmbH and Co., Biberach, Fed. Rep. of Germany

Filed Mar. 21, 1983, Ser. No. 477,216

Claims priority, application Fed. Rep. of Germany, Apr. 23, 1982, 3215255

Int. Cl.³ A61C *1/06*

U.S. Cl. 433—131 **19 Claims**



1. A dental handpiece set comprising a handpiece housing, a power supply module detachably coupled to one end of the handpiece housing for supplying power to operate the handpiece, means provided in the handpiece housing to mount therein a motor unit which is coupled to the power supply module, and a drive train extending within the handpiece housing to an opposite end of the handpiece housing at which a dental implement can be mounted to be driven by the drive train when the motor used is mounted in the handpiece housing:

in which said one end of the handpiece housing is adapted removably to receive the motor unit, as an exchangeable motor unit, so that a housing of the motor unit is securable against rotation within the handpiece housing;

and in which at least two functionally different types of motor units are provided to be mounted selectively in the handpiece housing according to operation requirements for the dental handpiece, each motor unit being arranged so as to be capable of being received by the handpiece housing via said one end thereof and being adapted for coupling with the power supply module.

4,504,228

DENTAL CASTING

Teruo Maetani; Ryoichi Miyoshi; Yukinori Nahara; Yasuyuki Kawazoe, and Taizo Hamada, all of Hiroshima, Japan, assignors to Daikin Kogyo Co., Ltd., Japan

Filed Mar. 9, 1982, Ser. No. 356,510
Int. Cl.³ A61K *6/08*
U.S. Cl. 433—199 **9 Claims**

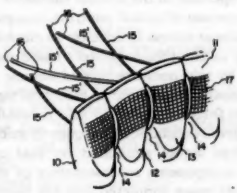
1. A dental casting coated with a tetrafluoroethylene polymer.

4,504,229

DENTAL PLACEMENT DEVICES AND METHODS

Jon C. Garito, 264 Hedge La., Hewlett Harbor, N.Y. 11577, and Alan G. Ellman, 1 Auerbach La., Lawrence, N.Y. 11516

Continuation-in-part of Ser. No. 282,942, Jul. 13, 1981, abandoned, and a continuation-in-part of Ser. No. 437,803, Oct. 29, 1982, abandoned. This application Jan. 14, 1983, Ser. No. 458,147
Int. Cl.³ A61C *5/00*
U.S. Cl. 433—215 **17 Claims**



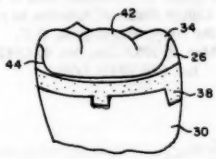
1. A novel dental placement device for splinting a patient's teeth in combination with an elongated malleable splint strip having perforations and a length enabling the splint strip to be positioned along the dental arch so as to overlie end stable teeth and at least one intermediate mobile tooth and having a height perpendicular to its elongated direction enabling the splint strip to be located between the gingival tissue and the teeth biting surfaces, said placement device comprising multiple flexible monofilaments sized to fit interproximally of the patient's teeth without physically enlarging the interproximal spaces, said monofilaments having a surface constituted of a material to which bonding material will not adhere, median portions of each of the monofilaments being attached to spaced regions of the splint strip separated lengthwise along the splint strip by distances approximating the interproximal spaces between the patient's teeth where the splint is to be positioned, the orientation of each of the monofilaments being along the splint height such that the two free ends of each monofilament, when pulled taut in a direction transverse to the dental arch where the splint strip is to be positioned, will be located over and can be positioned in the same interproximal space with adjacent monofilaments being located over and positionable in adjacent interproximal spaces, whereby the splint strip can be supported by the ends of the monofilaments while positioning the splint strip on the patient's dental arch so as to overlie the said stable and immobile teeth, with the free ends of each monofilament located proximate to a different interproximal space so they can be placed in the same proximate interproximal space and used to pull and hold the splint strip against the patient's teeth and into the said interproximal spaces while bonding with bonding material the splint strip to the patient's teeth, a non-adhering character of the monofilament surface enabling removal of the monofilament from the interproximal spaces leaving only the splint strip bonded to and across the patient's teeth.

4,504,230

PREFABRICATED DENTAL ONLAYS AND METHOD THEREFOR

Stanley J. Patch, Great Lakes, Ill., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 23, 1983, Ser. No. 478,577
Int. Cl.³ A61C *5/08*
U.S. Cl. 433—219 **5 Claims**



1. A dental crown comprising:

a generally ring-shaped crown body having a wall and adapted for securing the body to one of a tooth and a preparatory foundation disposed upon the tooth, the wall defining a cavity, the cavity being fillable with a filler material, and

an overlay member having an occlusal portion and a securement portion with an adherentable surface, the securement portion being adapted for mating engagement with the wall of the crown body,

the crown body having means for receiving a filler material for securing the crown body to the tooth, the securement portion of the overlay member having means for securing the overlay member to the crown body.

4,504,231

PROCESS FOR FILLING TEETH

Francis F. Koblitz, York, and Jane L. Reichart, Hanover, both of Pa., assignors to Dentsply Research & Development Corp., Milford, Del.

Continuation of Ser. No. 233,951, Feb. 17, 1981, abandoned. This application Apr. 11, 1983, Ser. No. 470,177

Int. Cl.³ A61K *6/08*

U.S. Cl. 433—228 **6 Claims**

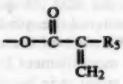
1. A process for filling teeth comprising

applying to a prepared tooth cavity a light polymerizable adhesive comprising

a polymerizable resin composition comprising

(a) more than about 50% by weight of at least one silane having the formula

where R_1–R_4 are the same or different and are H, alkyl, alkenyl, aryl, aralkyl, alkaryl, alkoxy, vinyl, aryloxy, or acyloxy having from 1 to about 30 carbon atoms and where at least one of R_1–R_4 is alkyl, aryl, aralkyl or alkaryl having from 1 to about 30 carbon atoms and is substituted with at least one group having the formula



where R_5 is H, alkyl or alkenyl having from 1 to about 6 carbon atoms, and

(b) up to about 50% of a polymerizable ethylenically unsaturated material, and

an amount of a photosensitizing system effective to cause polymerization of said adhesive when said adhesive is exposed to actinic light, and exposing said adhesive to actinic light for a time sufficient to harden said adhesive.

4,504,232

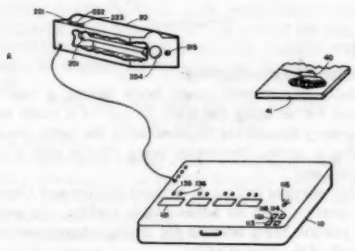
BATTLEFIELD FRIEND OR FOE INDENTIFICATION TRAINER

Gary M. Bond, and Albert H. Marshall, both of Orlando, Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 3, 1983, Ser. No. 471,942

Int. Cl.³ F41G *3/26*

U.S. Cl. 434—11 **20 Claims**



1. An apparatus for training students in identification of thermal signatures comprising in combination:

means for presenting pseudo-thermal images;

means for viewing said images in a manner which simulates a thermal sight;

means for electronic identification of said images by students as representative of a friend or foe, having an output;

means for scoring said identification in terms of elapsed time and correctness, operably connected to receive input from said identification means and having a plurality of inputs and outputs; and

means for displaying said time and correctness operably connected to said scoring means.

4,504,233

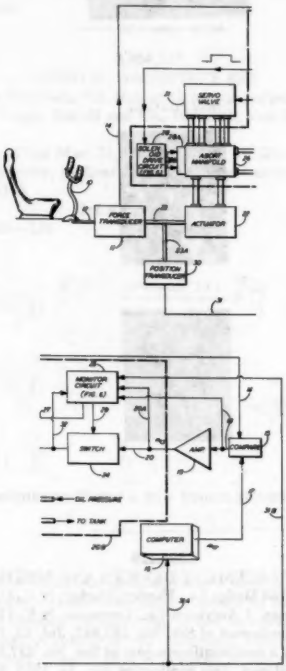
HIGH PERFORMANCE CONTROL LOADING SYSTEM FOR MANUALLY-OPERABLE CONTROLS IN A VEHICLE SIMULATOR

Dean M. Galus, Endicott, and Brian E. Sill, Binghamton, both of N.Y., assignors to The Singer Company, Binghamton, N.Y.

Filed Dec. 20, 1982, Ser. No. 451,133

Int. Cl.³ G09B *9/08*

U.S. Cl. 434—45 **36 Claims**



1. A high performance control loading system for conveying to manually-operable controls of a vehicle simulator a "feel" sensed by an operator of the vehicle simulator that matches the real world response of actual controls, comprising:

force transducer means to develop an electrical signal corresponding to the force applied to said manually-operable controls by said operator of said vehicle simulator;

computer means to generate an electrical signal corresponding to the force required for said manually-operable controls to give realistic sensory cues to said operator;

said electrical signal generated by said computer means includes components representative of characteristics of the vehicle being simulated and the particular maneuver being performed;

means to compare said signal corresponding to the applied

force with said signal corresponding to the required force and to provide an electrical signal corresponding to the difference;

actuator means including means to develop, on said manually-operable vehicle controls, a force responsive to said difference electrical signal to give the sensory cue of actual controls in an actual vehicle, and

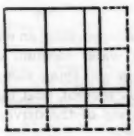
monitor means to detect deviations in force magnitude from said force responsive to said difference electrical signal and to disable the control loading system when said force magnitude exceeds a pre-set limit.

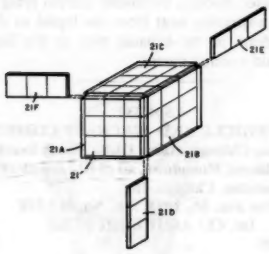
4,504,234

AIDING MATHEMATICAL LEARNING

Arthur B. Jarvis, Shrewsbury, Mass., assignor to Mathographics Research Corporation, Bedford, Mass.

Filed Jan. 16, 1984, Ser. No. 570,802
Int. Cl.³ G09B *19/02*
U.S. Cl. 434—188 **5 Claims**





1. Apparatus for aiding mathematical learning comprising,

means defining a plurality of contiguous congruent elements comprising contiguous unit squares,

and overlaying means for overlaying at least some of said congruent elements to illustrate mathematical processing represented by the relationship between at least some of said congruent elements and said overlaying means,

said overlaying means comprising a first plurality of overlaying elements each bounded by a square congruent with a said unit square and a second plurality of overlaying congruent elements each comprising a rectangle having a length equal to and a width a submultiple of the length of a side of a said unit square.

4,504,235

EDUCATIONAL DEVICE FOR TEACHING COLLATING SKILLS

Corey N. Jones, Severn, and Thomas Chapline, Laurel, both of Md., assignors to PSI Associates, Inc., D.C.

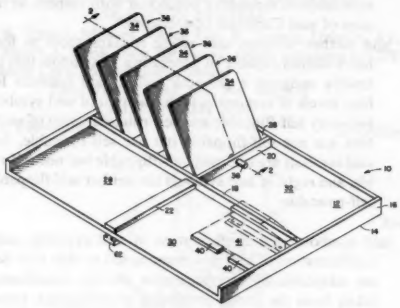
Filed Jun. 26, 1984, Ser. No. 624,736
Int. Cl.³ G09B *19/00*
U.S. Cl. 434—219 **15 Claims**

1. An educational device comprising:

a board having a top surface and a bottom surface, said top surface divided into a plurality of compartments, including

a holding compartment having holding means for individually holding a supply of distinct papers to be collated;

a collating compartment for organizing distinct papers from said holding compartment into a collated set; and



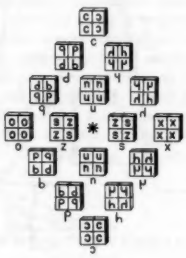
a fastening compartment having retaining means for retaining a removable fastening device for fastening together papers in a collated set from said collating compartment.

4,504,236

DEVICES FOR DISPLAYING OR PERFORMING OPERATIONS IN A TWO-VALUED SYSTEM

Shea Zellweger, 119 E. College St., Alliance, Ohio 44601

Continuation of Ser. No. 272,634, Jun. 11, 1981, Pat. No. 4,367,066, which is a division of Ser. No. 044,170, May 31, 1979, Pat. No. 4,273,542, which is a continuation of Ser. No. 729,119, Oct. 4, 1976, abandoned. This application Dec. 27, 1982, Ser. No. 453,753
Int. Cl.³ G09B *1/32*
U.S. Cl. 434—433 **4 Claims**



1. An apparatus for displaying and performing a selected set of the $2^{(2n)}$ n-ary connectives obtained from a finite number, greater than two, of elements (A, B, C . . . n) in a two-valued notational system, said apparatus comprising:

a set of movable devices, said devices capable of being used in a selected combination, said combination also capable of being assembled in a predetermined conformation;

each of said devices having means displaying a plurality of symbols, wherein each said symbol represents one of sixteen binary connectives, said means having said plurality of symbols in a predetermined configuration;

each said means for displaying including a pair of areas such that second area is opposed to first area, said configuration selected such that first and second symbols are placed in said first and second areas and such that second-area symbol is a component-matching repeat in see-through orientation of first-area symbol;

each of said symbols having a shape selected to indicate a

selected number of from zero to four components arranged with respect to the quadrants of a set of Cartesian coordinates wherein said shape has iconicity, frame consistency, and eusymmetry with respect to said quadrants of Cartesian coordinates, and wherein the alignment of said shape is symmetry positional with respect to the x-y axes of said Cartesian coordinates;

and further wherein said shape is taken from at least six letter-shapes capable of generating 16 symbols that can be readily assigned a phonetic value, said symbols having four levels of symmetry such that two of said symbols are two-way self-flippable and self-rotatable, two of said symbols are not self-flippable but are self-rotatable, four of said symbols are one-way self-flippable but not self-rotatable, and eight of said symbols are neither self-flippable nor self-rotatable;

and

said symbols, said configuration of said symbols, and said conformation of said devices selected so that said devices are adaptable by rearrangement and by transformations taken from the group consisting of reflections, rotations, translations, counterchanges, and combinations thereof to display and perform said operations.

4,504,237

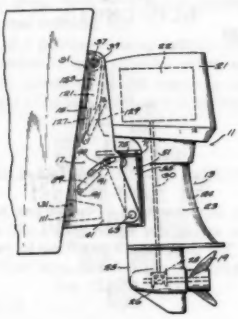
OUTBOARD MOTOR WITH DUAL TRIM AND TILT AXES

Clarence E. Blanchard, Kenosha, Wis., assignor to Outboard Marine Corporation, Waukegan, Ill.

Continuation of Ser. No. 167,337, Jul. 9, 1980, Pat. No. 4,406,632. This application Mar. 16, 1983, Ser. No. 475,931

Int. Cl.³ B63H *21/26*

U.S. Cl. 440—61 **3 Claims**



1. A bracket assembly for an outboard motor including a propulsion unit supporting a thrust producing element, said bracket assembly comprising transom bracket means adapted to be fixed to the transom of a boat, a member pivotally connected to said transom bracket means for swinging movement of said member relative to said transom bracket means about a first horizontal axis, said member having a lower part, means on said member adapted for supporting the propulsion unit so as to enable vertical pivotal swinging movement of the propulsion unit relative to said member about a second horizontal axis located below and in fixed predetermined spaced relation from said first horizontal axis and horizontal pivotal steering movement of the propulsion unit relative to said member about a steering axis transverse to said horizontal axes, and means on said transom bracket means and on said member lower part for engagement therebetween so as to enable transmission of side forces from said lower part of said member to said transom bracket means.

4,504,238

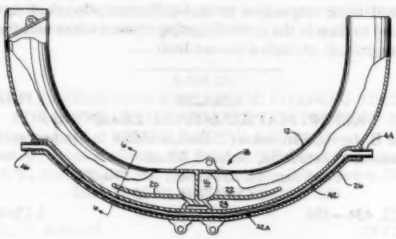
FLUID COOLER FOR MARINE DRIVES

Gerald F. Neisen, Oshkosh, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Dec. 23, 1982, Ser. No. 452,849

Int. Cl.³ B63H *21/32*

U.S. Cl. 440—89 **6 Claims**



1. In a marine drive incorporating an engine with an exhaust pipe having a cooling water medium discharged from the engine contained therein and lying along a wall of the pipe within at least a portion thereof, said marine drive having a liquid heated by operation of the drive, an improved liquid cooling means comprising:

liquid flow means through which the heated liquid flows, said liquid flow means being coupled in heat transfer relation to the portion of the exhaust pipe having the cooling water medium contained therein lying along the wall for transferring heat from the liquid to the cooling water medium in the exhaust pipe as the liquid flows through said cooling means.

4,504,239

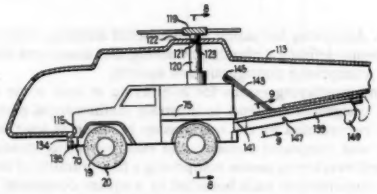
TOY LAND VEHICLE AND AIRCRAFT COMBINATION

Ralph J. Kulesza, Chicago; Harry Disko, South Barrington, and Dennis R. Gibbons, Hometown, all of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed Jan. 31, 1983, Ser. No. 462,318

Int. Cl.³ A63H *17/00, 29/02*

U.S. Cl. 446—95 **20 Claims**



1. Combinable toy vehicles comprising:

a first self-propelled vehicle having a body;

rotatable ground wheels supporting the body for movement along a surface;

motor means carried by the first vehicle and drivingly connected to at least one of the wheels;

a second vehicle having a shell with an opening;

a rotatable member mounted on the second vehicle and exposed outside the shell;

a portion of the body being insertable into the shell through the opening with the wheels exposed;

power transmission means carried by the first vehicle;

the power transmission means being driven by the motor means and having a power driver;

the rotatable member being couplable with the power driver upon insertion of the body into the shell;

latch means releasably retaining the body with the portion within the shell;

the second vehicle being supported on and propelled along a surface by the ground wheels with the rotatable member driven by the motor means; and

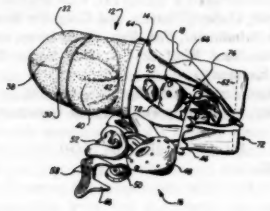
the second vehicle retaining and supporting the first vehicle with the rotatable member being driven by the motor means when the combined vehicles are lifted off the surface.

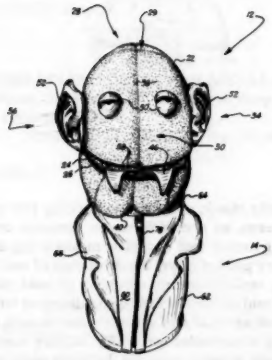
4,504,240

HAND PUPPET WITH DETACHABLE FACIAL ELEMENTS

John J. Thomas, North Olmsted, Ohio, assignor to American Greetings Corporation, Cleveland, Ohio

Filed Sep. 20, 1982, Ser. No. 419,720
Int. Cl.³ A63H *3/16*
U.S. Cl. 446—100 **5 Claims**





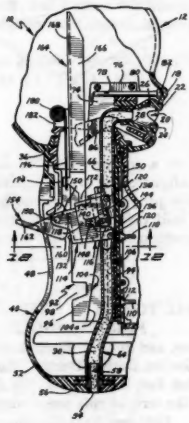
1. A hand puppet adapted to be formed into different characters, comprising a head portion; a plurality of facial components for detachable attachment to said head portion; a sleeve depending from said head portion; said sleeve defining an opening for receiving a person's arm for supporting the hand puppet therefrom; said sleeve including a storage compartment for storing said facial components; closure means for selectively opening and closing said storage compartment; said head portion having an outer peripheral surface defining a front portion, a top portion, a back portion and side portions extending between said front and back portions, said front portion of said outer surface having a recessed portion defining a mouth; a layer of a material which can engage "Velcro"-like material covering the portions of said outer surface defining said mouth and said front, top, back and side portions of said head portion, each of said detachable facial components including a layer of "Velcro"-like material for detachably engaging the component with any portion of said head portion in different locations on said head portion, and said detachable facial components including at least one set of teeth with a strip of "Velcro"-like material for detachable engagement to a part of said mouth.

4,504,241

TOY FIGURE WITH MANUALLY OPERABLE INGESTION SYSTEM

Lewis R. Dyson, Milford, Ohio; Dan B. Young, Hebron, Ky., and Stuart A. Cook, New Richmond, Ohio, assignors to CPG Products Corp., Minneapolis, Minn.

Filed Feb. 4, 1983, Ser. No. 464,079
Int. Cl.³ A63H *3/24*
U.S. Cl. 446—304 **22 Claims**



1. A toy figure comprising a body member having an outlet opening, a head attached to said body member having a mouth and an inlet associated with said mouth, tubular means connecting said inlet opening to said outlet opening, said tubular means including a generally straight longitudinal section of flexible tubular material, means constrained for movement in a rectilinear path along said longitudinal section in contact with said longitudinal section for compressing said longitudinal section as said compressing means is moved in a first direction away from said inlet opening toward said outlet opening to create a peristaltic effect within said tubular means, and manually-operable means for advancing said compressing means along said rectilinear path.

4,504,242

MODULAR UNIT WITH TOY VEHICLE PROPULSION DEVICE

Philip W. Crain, San Pedro, and Raymond M. St. Pierre, Hawthorne, both of Calif., assignors to Mattel, Inc., Hawthorne, Calif.

Filed Jun. 4, 1982, Ser. No. 384,833
Int. Cl.³ A63H *29/00*
U.S. Cl. 446—429 **7 Claims**

1. In a modular unit for a toy vehicle traversing layout, the combination comprising:

a generally planar surface adapted to form a lane for passage thereover of a toy vehicle;

a toy vehicle propulsion device affixed to said modular unit adjacent to said lane, said propulsion device including:

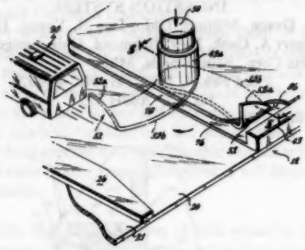
a sleeve member formed in said unit adjacent said lane;

a driving member having cam means with a cam portion and being mounted for pivotable movement about an axis generally perpendicular to the plane of said lane;

means normally biasing said driving member to a first position away from said lane; and

actuating means including a plunger member with a cam

pin, said plunger member being slidably mounted in said sleeve member and being manually depressible along said axis, said plunger member cam pin coacting with the cam portion of said cam means of said driving member and the biasing means for pivoting said driving



member to a second position, said driving member being configured for urging against the body of a toy vehicle for propelling the same in response to movement of said driving member from said first to said second position.

4,504,243

EDUCATIONAL TOY WITH PATH CREATING TILES FOR A VEHICLE

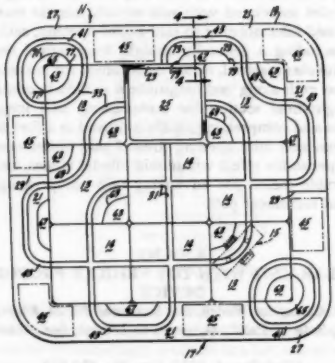
Gordon A. Barlow, and John R. Krutsch, both of Glenview, Ill., assignors to Gordon Barlow Design, Skokie, Ill.

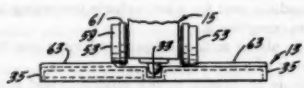
Filed Jan. 3, 1983, Ser. No. 455,412

The portion of the term of this patent subsequent to Aug. 31, 1999, has been disclaimed.

Int. Cl.³ A63H *19/28*

U.S. Cl. 446—447 **4 Claims**





1. An educational toy for a child including:

a rectangular frame surrounding a rectangular center area,

a plurality of generally similar rectangular tiles slidable relative to one another in the center area to fill the center area except for one vacant space equal in size to a tile,

a pair of grooves formed in the top surface of each of the tiles with each groove extending from one side edge of a tile to another side edge of a tile with all grooves intersecting the side edges of its tile at the midpoint of each side edge so that continuous paths can be formed on adjacent tiles,

turnaround grooves formed in the rectangular frame with each turnaround groove opening at its opposite ends into the rectangular center area of the frame with the ends of the arcuate groove spaced from each other and positioned so that the grooves of the tiles can be aligned with the turnaround grooves to form a continuous vehicle path from the tiles onto the rectangular frame and then back onto the tiles, and

a vehicle adapted to move across the tiles and frame, said vehicle having a guide means which rides in the grooves to guide the vehicle along a path defined by the grooves as it moves across the tiles and frame.

4,504,244

ROTATIONALLY ELASTIC COUPLING

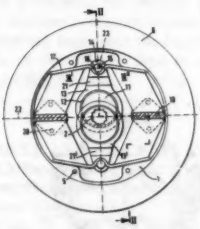
Franz-Josef Wolf; Hubert Pletsch, and Gregoire Benneyan, all of Bad Soden-Salmünster, Fed. Rep. of Germany, assignors to WOCO Franz-Josef Wolf & Co., Bad Soden-Salmünster, Fed. Rep. of Germany

Filed Jan. 5, 1983, Ser. No. 455,694

Claims priority, application Fed. Rep. of Germany, Nov. 25, 1982, 3243640

Int. Cl.³ F16D *3/68, 3/50*

U.S. Cl. 464—83 **24 Claims**



1. A rotationally elastic coupling comprising two rotatable half coupling means, an eccentric means mounted on one of said half coupling means, said eccentric means being displaced along a translatory path of travel upon rotation of said one half coupling means, resilient means mounted on said other half coupling means, said resilient means being disposed within said translatory path of travel of said eccentric means such that said resilient means is compressed generally radially inwardly in resiliently resisting relative rotation between said two half coupling means, whereby said two rotatable half coupling means are thereby resiliently coupled.

4,504,245

TELESCOPIC COUPLING EMPLOYING ROLLERS AND APPLICATIONS THEREOF

Michel A. Orain, Conflans Sainte Honorine, France, assignor to Glaenzer Spicer, Poissy, France

Continuation of Ser. No. 338,956, Jan. 12, 1982, abandoned. This application Mar. 6, 1984, Ser. No. 585,033

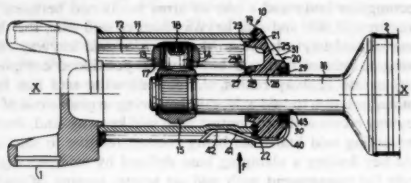
Claims priority, application France, Jan. 16, 1981, 81 00732

Int. Cl.³ F16D *3/06*

U.S. Cl. 464—167 **10 Claims**

1. A rolling telescopically extensible coupling having an axis on which the coupling is extensible and comprising a tubular sleeve which has a non-circular cross-sectional outer and inner shape and has generatrices parallel to said axis, a rod radially spaced from the sleeve and coaxial with the sleeve on said axis, at least two trunnions rigid with the rod, at least two rollers

respectively rotatively mounted on the trunnions, abutment means radially extending from the rod and axially rigid with the rod, said sleeve defining at least two runways receiving said at least two rollers, a cover composed of a plastics material and carried on the sleeve at an end of the sleeve, a fastener which is elastically yieldable as compared to the cover for securing the cover to the sleeve, said fastener having a portion which is located on a side of said cover remote from said sleeve and is in axially supporting relation to the cover and defines an aperture through which aperture said rod extends, means for radially locating the cover relative to the sleeve and centering the cover on said axis, said cover defining a recess in a plane



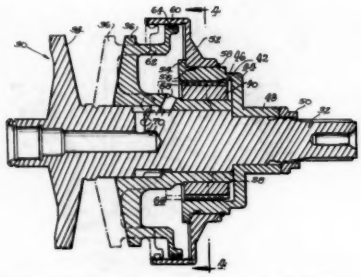
perpendicular to said axis, the shape of said recess being substantially identical to said non-circular cross-sectional shape of the sleeve and said recess abutting against an adjacent end of the sleeve with interposition of a sealing element, said cover being substantially rigid and defining an opening which is in sealing and guiding contact with the rod and said cover acting as an axial abutment for cooperation with said abutment means radially projecting from and rigid with the rod, said rollers engaged in said runways and said opening which is defined by said cover and is in guiding contact with said rod constituting means for maintaining said rod coaxial with said sleeve during operation of said coupling.

4,504,246

REVISED SPLINE DRIVE FOR METAL BELT CVT

Philip J. Mott, Des Plains, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Dec. 14, 1983, Ser. No. 561,482
Int. Cl.³ F16H *55/56*
U.S. Cl. 474—8 **5 Claims**



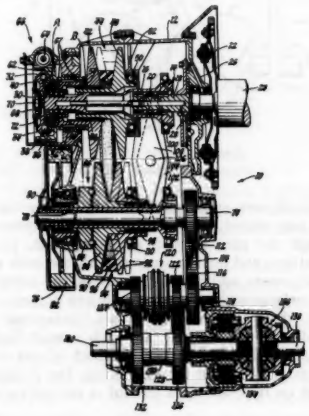
1. In a variable pulley transmission comprising:
a drive shaft and a driven shaft, a drive pulley connected to said drive shaft, said drive pulley having a pair of flanges defining a generally V-shaped space therebetween with at least one flange being axially movable with respect to the other and to said drive shaft, a driven pulley connected to said driven shaft, said driven pulley having a pair of flanges defining a generally V-shaped space therebetween with at least one flange being axially movable with respect to the other and to said driven shaft, means drivingly interconnecting said drive and driven pulleys, means drivingly connecting said axially movable flanges to their respective shafts while permitting the axial movement thereof; the improvement wherein said drivingly connecting means comprises:
an external spline on each axially movable flange;
coupling members each connected to a shaft; and
an internal spline on each coupling member meshing with the external spline on the respective axially movable flange.

4,504,247

CONTROL MECHANISM FOR A VARIABLE RATIO DRIVE SYSTEM

Howard E. Chana, Troy, and Calmer M. Stordahl, Rochester, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jun. 8, 1983, Ser. No. 502,171
Int. Cl.³ F16H *11/06*
U.S. Cl. 474—17 **3 Claims**



1. An improvement in ratio controls for a belt and pulley system wherein each pulley has at least one movable member and the belt and pulley system has an input shaft and an output shaft; the improvement comprising: output torque sensitive cam means disposed between the output shaft and one movable member of one pulley for applying an axial force proportional to the output torque to the one pulley to control belt tension; input torque sensitive means disposed between the input shaft and one movable member of another pulley for applying an axial force proportional to the input torque of the other pulley to control belt tension; and ratio selector means for selecting ratios and for applying a force in addition to or subtraction from the force on the other pulley for balancing the forces on both pulleys when the ratio selected is achieved and the belt tension is controlled.

4,504,248

VARIABLE AND REVERSIBLE TRANSMISSION

John D. Hollinger, 10428 Winston Ln., Indianapolis, Ind. 46256

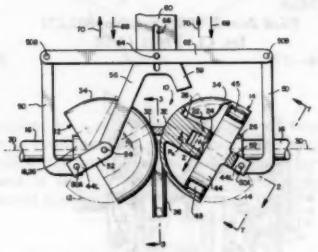
Filed Sep. 27, 1982, Ser. No. 423,539
Int. Cl.³ F16H *55/56*
U.S. Cl. 474—24 **5 Claims**

1. A variable transmission means, comprising:
a pair of generally semi-spherical drive head components;
a drive shaft connected to each said drive component by a swivel joint having as one of its connections a connector passing through the axis of said shaft, and permitting relatively positioning the drive components with respect to their respective drive shaft such that the centerpoint of

the surface of the drive members is optionally in line or out of line with the axis of the respective shaft;

a pulley belt, and means movably supporting the pulley belt so that the pulley belt drivingly engages the said drive components to achieve a driving although movable interconnection of the two drive components by engagement of each of the drive components with the pulley belt at the same location along the pulley belt although on opposite sides thereof at said location along the pulley belt;

there being control means for moving and holding the drive components relative to their respective drive shafts such that the centerpoint of the surface of the drive components is optionally held in line or a selected amount out of line with the axis of the respective drive shafts;



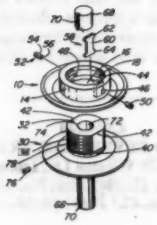
the generally semi-spherical nature of the drive components, and their swivel connections to their respective shafts through the axes thereof, providing that, as they are moved into and held in various positions with respect to the alignment and non-alignment of the centerpoint of their surfaces with reference to the axis of their respective shafts, their surface-portions are juxtaposed and are spaced from one another only such a small distance that the pulley belt drivingly contacts both of said drive components at the same location along the pulley belt although on opposite sides thereof at the pulley belt location.

4,504,249

H-KEY ADJUSTABLE PULLEY

Yvon Fortier, 102 Laflamme St., and Jean-Pierre Fortier, 132 Chouinard St., both of Ste. Claire, Dorchester, Co., Canada G0R 2V0

Filed May 7, 1982, Ser. No. 376,015
Claims priority, application Canada, Apr. 22, 1982, 401482
Int. Cl.³ F16H *9/18*
U.S. Cl. 474—33 **20 Claims**



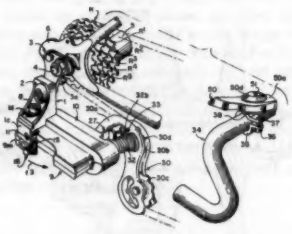
1. In an adjustable pulley construction comprising a first disc having at least one belt-engaging surface and having an axially extending centrally located internally threaded annular hub, said hub having an exterior flat face and an interior recess, a second disc defining at least one belt-engaging surface and having a centrally located externally threaded axle, said hub being coaxially and threadedly connected to said axle and being axially movable relative thereto, said belt-engaging surface being positioned in facing relationship, whereby a pulley belt can be located therebetween, the improvement comprising means securing said hub to said axle thereby to maintain a desired spaced relationship between said belt-engaging surfaces, said securing means including a threaded bore provided in said hub, said bore being transverse to said axle, a set screw received in said bore, a longitudinal, axially-extending, keyway recess in said hub communicating with said threaded bore, a keyway land provided on said axle adapted to be located in line with said set screw, and a generally H-shaped key having a rectangular body and a pair of arms positioned between said bore in said hub and said keyway land of said axle, the thickness of said key relative to the depth of said keyway recess being so related that said key may be positioned completely within said keyway recess, thereby allowing said hub to be rotated relative to said axle, said key being urgeable out of said keyway recess and into contact with said keyway land, thereby preventing said hub from being rotated relative to said axle, said key having a clamping base defined by said rectangular body for engagement with said set screw, turning of said set screw operating to move the end of said set screw relative to said key to provide a frictional clamping action of said key onto said keyway land, a first arm of said H-shaped key projecting outwardly beyond the exterior flat face of said hub, a second arm of said H-shaped key projecting inwardly into said interior recess and the length of said arms being greater than the width of said keyway recess, thereby to retain said key within said recess upon removal of said screw.

4,504,250

CONTROL DEVICE WHICH PROVIDES A PLURALITY OF PRE-ESTABLISHED AND CONTROLLED POSITIONS, MORE PARTICULARLY FOR USE WITH THE SPEED GEAR SHIFTING DEVICES FOR CYCLES AND THE LIKE

Henri Juy, Dijon, France, assignor to Etablissements Le Simplex, France

Filed Jun. 24, 1982, Ser. No. 391,913
Claims priority, application France, Jul. 3, 1981, 81 13459
Int. Cl.³ F16H *11/08*
U.S. Cl. 474—80 **17 Claims**



1. Control device providing a plurality of pre-established and controlled positions, more particularly for use with a speed gear shifting device for a cycle and the like having a free wheel and associated sprockets, of the type in which a chain-guide assembly (**30**) supported slidably by a first pin (**29**) is shifted transversely relative to a casing (**9**), this device including control means (**41** and **69**) which are shifted angularly always with the same amplitude in either direction, from a neutral position up to a limit position; at least one control transmission means (**15**) for the connection of the control means with a link mechanism (**18** and **56**), the link mechanism being pivoted angularly in either direction and shifting alternately pawls (**23**, or **57**, **60**), cooperating with a rack (**27**) provided with notches (**27*b*–27*c***) in a number corresponding to the number of the pre-estab-

lished positions to be provided, spaced corresponding to the spacing between each one of the sprocket of a free wheel, said rack being mounted parallel to the first pin (29) supporting the chain guide to be positioned from which the rack is depending, and the device being characterized in that a second pin (14) is shifted angularly through the transmission means (15) driven by the control means (41 or 69), said second pin being made fast with the link, an extension (18*b* or 56*a*) of which receives the thrust of an elastic means (19) tensioned in accordance with the direction of swivelling and which tends to permanently bring back said link to a neutral position of the control means said link cooperating with a system of at least two partly superposed pawls (23 or 57, 60), intended for engagement in succession within the notches (27*b*–27*c*) of the rack (27), the extreme notches (27*c*) partly obturated of said rack being at different levels for the two extreme notches, so that the corresponding pawl will be unable to pull along the rack beyond the preestablished limit position to be occupied by the chain-guide (30).

4,504,251

HYDRAULIC CHAIN TENSIONER

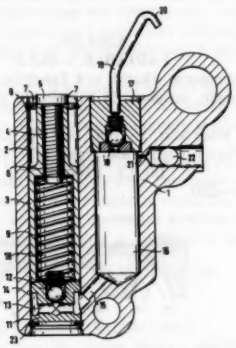
Walter Mittermeier, Stuttgart-Stammheim, Fed. Rep. of Germany, assignor to Dr. Ing. h.c.F. Porsche A.G., Fed. Rep. of Germany

Filed Nov. 12, 1982, Ser. No. 440,956

Claims priority, application Fed. Rep. of Germany, Nov. 13, 1981, 3145115

Int. Cl.³ F16H *7/08*

U.S. Cl. 474—110 **11 Claims**



1. A hydraulic chain tension adjusting device, comprising a hydraulic housing means provided with a housing bore, a hollow piston means serving the purpose of chain tensioning which is longitudinally guided in said housing bore, said hollow piston means being under oil pressure at its bottom side and being spring-loaded additionally by a compression spring, characterized in that a plug means is pressed into a substantially smooth central bore of the hollow piston means at the top side thereof, said plug means including a shank into which a groove means is machined for establishing a connection between the interior space of the hollow piston means and the atmospheric air.

4,504,252

BELT TENSIONER

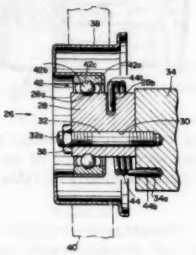
Masayuki Honma, Tokyo, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Continuation of Ser. No. 238,746, Feb. 27, 1981,. This application Jul. 27, 1984, Ser. No. 634,666

Claims priority, application Japan, Mar. 7, 1980, 55-28830[U]

Int. Cl.³ F16H *7/12, 7/10*

U.S. Cl. 474—112 **1 Claim**



1. A belt tensioning device comprising:

a belt;

a pulley in rolling contact with said belt;

a stud bolt studded to a stationary member;

a shaft of generally uniform round section, having an eccentric axis of rotation by being formed with an eccentric hole in which said stud bolt is fitted, said shaft being also formed with a circumferential groove;

bearing means for concentrically and rotatably mounting said pulley on said shaft, having a plurality of balls and a ring attached to said pulley and formed with a circumferential groove which cooperates with the groove in said shaft to confine therein said balls;

a coil spring disposed to encircle said shaft in an eccentric relation to said axis of rotation and having an end fixed to said shaft and the other end fixed to said stationary member so as to urge the shaft to rotate in the direction causing the pulley to move toward the belt;

said stud bolt having a threaded free end portion protruded from said hole; and

a nut screwed onto said threaded free end portion of the stud bolt to fixedly attach the shaft to the stationary member, whereby the degree of tension on said belt is readily adjustable by loosening said nut, rotating said shaft and tightening said nut.

4,504,253

MATERIAL MIXING APPARATUS

Floyd E. Buschbom, Long Lake, and Donald L. Henke, Maple Plain, both of Minn., assignors to Veda, Inc., Long Lake, Minn.

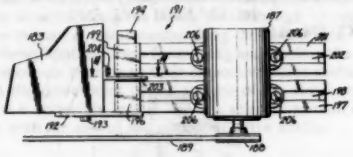
Division of Ser. No. 269,634, Jun. 2, 1981, Pat. No. 4,405,040, which is a division of Ser. No. 115,184, Jan. 25, 1980, Pat. No. 4,462,693. This application Sep. 16, 1982, Ser. No. 419,017

Int. Cl.³ F16H *7/14*

U.S. Cl. 474—114 **13 Claims**

1. A power transmission comprising: housing mens having a chamber, power input shaft means rotatably mounted on said housing means, power output shaft means rotatably mounted on said housing means, power transfer means located in said chamber drivably connecting the input shaft means with the output shaft means, motor means for driving the input shaft means, mount means secured to the housing means, and means connecting the motor means to the mount means, said mount means including first means attached to the housing means, and second means mounted on the first means, said means connecting the motor means to the mount means being attached to the second means, said first means of the mount means including a

generally linear member having a non-circular cross section, said linear member extended generally parallel to the input shaft means, said second means comprising an arm means having sleeve means surrounding the linear member, said



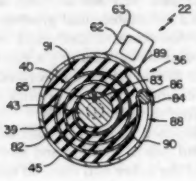
sleeve means having a non-circular passage generally corresponding to the cross sectional shape of the linear member whereby the sleeve means is linearly movable with respect to the linear member.

4,504,254

BELT TENSIONER AND METHOD OF MAKING THE SAME

Randy C. Foster, Springfield, Mo., assignor to Dayco Corporation, Dayton, Ohio

Filed Jul. 28, 1982, Ser. No. 402,441
Int. Cl.³ F16H 7/12
U.S. Cl. 474—133 **16 Claims**



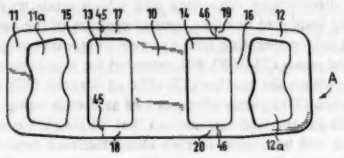
1. In a tensioner for a power transmission belt or the like that is adapted to be operated in an endless path, said tensioner comprising a support means for being fixed relative to said belt, a belt engaging means carried by said support means and being movable relative thereto, said belt engaging means including a lever arm having opposed ends, polymeric spring means being operatively associated with said support means and said belt engaging means for urging said belt engaging means relative to said support means and against said belt with a force to tension said belt, and coiled mechanical spring means also being operatively associated with said support means and said belt engaging means for urging said belt engaging means relative to said support means and against said belt with a force to tension said belt whereby said polymeric spring means and said mechanical spring means combine to define the tensioning force for said belt while said polymeric spring means additionally tends to dampen the movement of said belt engaging means relative to said support means, said mechanical spring means being substantially completely embedded in said polymeric spring means so that said mechanical spring means is substantially completely engaged and surrounded by said polymeric spring means, said coiled mechanical spring means having opposed ends, the improvement wherein one of said ends of said mechanical spring means extends out of said polymeric spring means and is operatively interconnected to said lever arm intermediate said opposed ends thereof whereby said polymeric spring means is operatively interconnected to said belt engaging means solely by said one end of said mechanical spring means.

4,504,255

SIDE-BAR DRIVE CHAIN

Manfred Rattunde, Bad Homburg, Fed. Rep. of Germany, assignor to Reimers Getriebe AG, Zug, Switzerland

Filed Dec. 22, 1982, Ser. No. 452,041
Claims priority, application Fed. Rep. of Germany, Dec. 29, 1981, 3151728
Int. Cl.³ F16G 1/00
U.S. Cl. 474—201 **11 Claims**



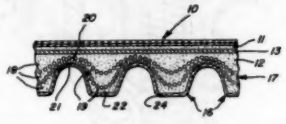
1. In a side-bar chain having a chain length, chain links each formed of a stack of individual side bars and chain pins traversing aligned side bar openings in the side bars of each stack transversely to the chain length; and a plurality of chain braces each formed by opposite outermost, brace-forming side bars of at least some of the chain links and a transverse web joining said brace-forming side bars to one another and straddling the side bar stack transversely to the chain length; each said brace-forming side bar including a longitudinal web extending parallel to the chain length between said side bar opening and said transverse web; said transverse web having an outer width dimension measured parallel to said chain length; said width dimension being substantially equal to a length dimension of said brace-forming side bars, measured parallel to said chain length; the improvement comprising means defining an aperture in said transverse web of each said chain brace for reducing to such an extent a cross-sectional dimension of said transverse web measured parallel to the chain length at least adjacent the longitudinal web of each said brace-forming side bar that said brace-forming side bars have deformation characteristics substantially equal to the individual side bars.

4,504,256

VARIABLE V-BELT

Kaname Matsumura, Akashi, and Takahiko Komai, Takasago, both of Japan, assignors to Mitsuboshi Belting Ltd., Kobe, Japan

Filed Mar. 15, 1982, Ser. No. 358,051
Claims priority, application Japan, Mar. 17, 1981, 56-33711
Int. Cl.³ F16G 5/20
U.S. Cl. 474—250 **8 Claims**



1. In a raw edge cogged V-belt having as a portion thereof a compression section defined by a plurality of longitudinally spaced cogs defining valley portions and peak portions being formed of rubber, the improvement comprising:

a plurality of layers of transversely extending reinforcing fabric cords in said compression section, each said layer extending serpentinely longitudinally of the belt to extend inwardly from the valley portions of the cogs into the peak portions thereof to provide an improved uniform resistance to lateral pressure in the cogs, said layers having variable spacing therebetween longitudinally of the belt so

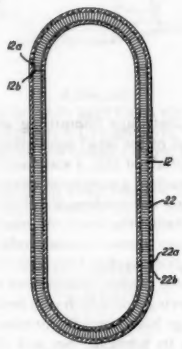
as to be closely juxtaposed at the valley portions of the cogs and substantially spaced in the peak portions thereof; and

short reinforcing fibers extending transversely of said V-belt including fibers distributed between the distal ends of the peak portions of the cogs and the cord layer closest thereto.

4,504,257
UNIVERSAL V-BELT

Arthur J. Cennamo, 19 Gardenia Dr., Commack, N.Y. 11725

Filed Jun. 14, 1982, Ser. No. 387,978
Int. Cl.³ F16G *7/02*
U.S. Cl. 474—256 **6 Claims**



5. A universal V-belt of the type used in power transmission for coupling at least two pulleys together comprising

(a) a connector element comprising a tear-resistant material of uniform cross-section along its total length, and having ridges transverse to the axis of the connector element over its entire surface; and

(b) a tube element comprising a tear-resistant material of uniform cross-section along its total length, said tube element having a continuous longitudinal channel having interior walls formed with ridges transverse to said longitudinal channel,

wherein said tube element is adapted to receive said connector element so that the ridges on said connector element interlock with the ridges in said longitudinal channel of said tube element, and

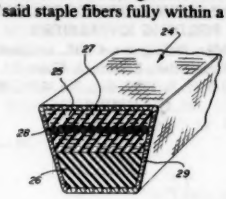
wherein the ends of said connector element abut each other at a point along said continuous loop belt approximately diametrically opposite from a point at which the ends of said tube element abut, said connector element and said tube element thereby defining a continuous loop belt which is solid throughout.

4,504,258
POWER TRANSMISSION BELT

Hideaki Tanaka, Kobe; Kunihiro Fujita, Hyogo, and Mitsuhiro Ushiroda, Kobe, all of Japan, assignors to Mitsuboshi Belting Ltd., Kobe, Japan

Filed Mar. 15, 1983, Ser. No. 475,442
Claims priority, application Japan, Sep. 17, 1981, 56-138574[U]
Int. Cl.³ B65G *15/34*
U.S. Cl. 474—263 **19 Claims**

1. In a V-belt having a belt body comprising an inner compression rubber portion, an outer tension rubber portion contiguous with said compression portion, and tensile cords extending longitudinally of the belt, the improvement comprising a plurality of primarily transversely extending reinforcing staple fibers distributed in at least one of said rubber portions, said tensile cords being embedded within the distribution of said staple fibers fully within a single one of said

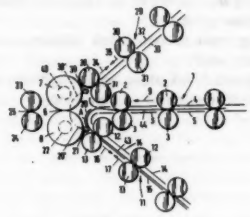


rubber portions to be spaced from the other rubber portion.

4,504,259
FOLDING MACHINE

Johann Lindenmüller, Fürstenfeldbruck, Fed. Rep. of Germany, assignor to Autelca AG, Switzerland

Filed Dec. 8, 1983, Ser. No. 559,331
Claims priority, application Switzerland, Dec. 9, 1982, 7163/82
Int. Cl.³ B31B *1/28*
U.S. Cl. 493—23 **3 Claims**



1. Folding machine, characterized in that a first folding material conveying device (1) with a straight conveying route, oriented toward the roll nip (6) of a pair of folding rolls (7, 8), and a second folding material conveying device (11) of identical conveying speed, but with reversible conveying direction (16, 17) are arranged to be convergent at an acute angle toward the folding roll nip (6); that a deflection guide means (20) is associated with the two folding material conveying devices (1, 11) which is arranged in the apical zone of the acute angle and is movable into an operative position wherein it deflects the material from the end of the conveying route of the first conveying device (1) to the conveying route of the second conveying device (11), and into an ineffective rest position (20') wherein it vacates the space between the pair of folding rolls (7, 8) and the conveying routes; and that the drive mechanism for the conveying devices (1, 11) and for a moving means for the deflection guide means (20) is controlled so that, in the operative position of the deflection guide means (20), the material (43, 44) is conveyed in the first (1) and into the second conveying device (11) until the location (A) of the material (43, 44) to be folded has reached a predetermined point of the deflection guide means (20), then the deflection guide means (20) is moved into its rest position (20') and the first conveying device (1) is driven in its conveying direction (9) and simultaneously the second conveying device (11) is driven in the direction (17) in opposition to its previous conveying direction (16), in order to feed the material (43, 44), with the location (A) previously bent at the deflection guide means (20) in the leading position, to the folding roll nip (6).

4,504,260
METHOD AND APPARATUS FOR SCORING AND FOLDING ENVELOPES

Harold R. Lillibridge, Bulingame, Calif., assignor to Champion International Corporation, Stamford, Conn.

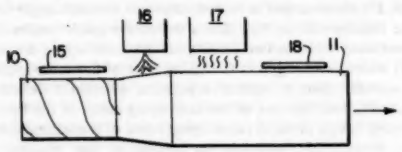
Filed Nov. 8, 1982, Ser. No. 439,728
Int. Cl.³ B31B 21/26
U.S. Cl. 493—249 18 Claims

1. A method of scoring and folding an envelope blank to form an envelope, said method comprising:
(a) moving an envelope blank along a rectilinear path;
(b) forming a lateral score line on said blank;
(c) moving said laterally scored blank along a curvilinear path while concurrently forming a pair of longitudinal score lines on said blank;
(d) halting movement of a leading edge of said blank while concurrently continuing movement of a trailing portion of said blank to invert said blank and fold the latter along said lateral score line;
(e) resuming movement of said inverted folded blank along a rectilinear path;
(f) applying gum to said blank adjacent said longitudinal score lines; and
(g) folding said blank along said longitudinal score lines to complete formation of said envelope.

4,504,261
METHOD OF MAKING A PAPER TUBE

Junkichi Tanaka, Yao, Japan, assignor to Tanaka Shikan Kabushiki Kaisha, Osaka, Japan

Filed Dec. 18, 1981, Ser. No. 332,259
Int. Cl.³ B31C 11/04
U.S. Cl. 493—273 2 Claims

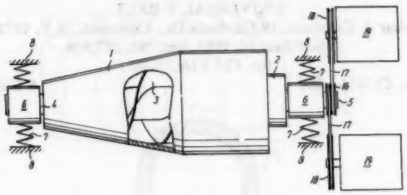


1. A method of making a paper tube comprising the steps of:
(a) winding a paper tape in a spiral, said paper tape having a cross-section selected from the group consisting of a parallelogram or a trapezoid, wherein the edges of the turns of the spiral, contact the edges of adjacent turns, the spiral wound paper tape forming a paper tube with contacting adjacent edges;
(b) grinding the surface of the paper tube to form a smooth surface thereon;
(c) coating the surface of the paper tube with a synthetic resin;
(d) drying the resin coating of tube; and
(e) grinding the resin coated surface of the tube, thereby forming a smooth surface thereon.

4,504,262
DECANTER CENTRIFUGE

Bjorn Forsberg, Horsholm, Denmark, assignor to Alfa-Laval Separation A/S, Soborg, Denmark

Filed Oct. 14, 1983, Ser. No. 542,170
Claims priority, application Denmark, Oct. 21, 1982, 4670/82
Int. Cl.³ B04B 1/20
U.S. Cl. 494—53 7 Claims

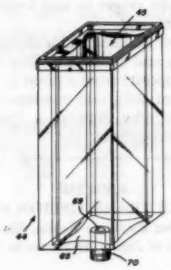


1. A decanter centrifuge comprising an elongate bowl, a bearing at each end of the bowl supporting the bowl for rotation about its longitudinal axis, a stationary support means for supporting each bearing, a conveyor screw located within the bowl and journalled for rotation about the axis of the bowl, drive means for rotating the bowl, differential drive means for causing the conveyor screw to rotate relative to the bowl, a load-transferring spring system interposed between each bearing and its associated support means, and each of said spring systems having a spring rate which is so low that the resiliently supported centrifuge has a natural vibration frequency considerably lower than its nominal rpm and that rotation at the natural vibration frequency during starting and stopping occurs at a low rpm where transitory deflections of the bowl ends do not present any problems.

4,504,263
FLOW RATE MONITOR WITH OPTICAL SENSING CHAMBER

Robert R. Steuer, and David H. Harris, both of Salt Lake City, Utah, assignors to ValleyLab, Inc., Boulder, Colo.

Continuation-in-part of Ser. No. 452,395, Dec. 22, 1982, abandoned. This application Nov. 10, 1983, Ser. No. 550,171
Int. Cl.³ A61M 5/16
U.S. Cl. 604—65 26 Claims



1. A gravity intravenous administration system for administering an IV solution from an IV container, said system comprising:
(A) means for storing an IV solution to be administered;
(B) a sensing chamber including
(a) a hollow housing made up of a plurality of vertically extending wall portions defining a hollow cavity,
(b) orifice means for introducing IV solution as a series of

drops into said cavity, said orifice means oriented so that said drops under gravity pass through said cavity,

(c) first and second of said wall portions arranged opposite each other,

(d) first lens means defined on said first wall portion,

(e) second lens means defined on said second wall portion, said first and second lens means arranged relative to each other to cause a light beam passing through them to be arranged as a series of parallel light rays within said cavity and defining a plane generally perpendicular to the path defined by the passing drops; and

(C) means for placing the IV container in fluid communication with said orifice means.

4,504,264

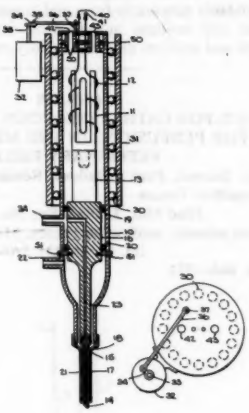
APPARATUS FOR AND METHOD OF REMOVAL OF MATERIAL USING ULTRASONIC VIBRATION

Charles D. Kelman, 269-70 Grand Central Pkwy., Floral Park, N.Y. 11005

Filed Sep. 24, 1982, Ser. No. 422,387

Int. Cl.³ A61B *17/20, 5/18*

U.S. Cl. 604—22 **7 Claims**



1. A surgical instrument adapted to be held in the hand and moved freely during operative use comprising:

a casing;

transducer means supported within said casing for generating high frequency mechanical vibrations upon excitation with a high frequency alternating-current electrical signal;

an operative tool at least partially external of said casing and supported thereby and coupled to said transducer means to be longitudinally vibrated thereby;

means for supporting said casing for lateral rotation;

means for laterally oscillating said csing and thereby laterally oscillating said operative tool;

a first fluid passage extending through said casing and in surrounding relation to at least a portion of said operative tool; and

a second fluid passage formed in part internally of said operative tool and extending into said casing, one of said passages being adapted to conduct a fluid to said operative tool and the other of said passages being adapted to withdraw fluid from the region adjacent said operative tool.

4,504,265

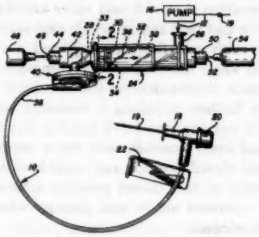
CHAMBERS TO ASSURE RELIABLE INFUSION OF MEDICAMENTS AND THE LIKE

William L. Rudzena, McHenry; Warren P. Frederick, Wonder Lake, and Albert Stone, Buffalo Grove, all of Ill., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Aug. 2, 1982, Ser. No. 404,069

Int. Cl.³ A61M *5/14*

U.S. Cl. 604—86 **14 Claims**



1. In a fluid administration set, an in-line chamber, an inlet port and an outlet port communicating with said chamber and defining part of the path of flow through said set, a sealing piston slidingly movable by fluid pressure within said chamber and capable of occupying first positions in which said sealing piston isolates fluid in said chamber adjacent the inlet port from the fluid in the chamber adjacent the outlet port, said sealing piston also being capable of occupying at least one second position, means permitting unlimited fluid flow between said inlet port and outlet port in the second position, and third port means for intermittently inserting a critical fluid into said chamber on the side of said sealing piston facing the outlet port, and fourth port means provided for removing fluid from the chamber on the side of said sealing piston facing the inlet port, to permit said piston to be moved toward the inlet port by fluid pressure as said critical fluid is inserted into the chamber on the side of said sealing piston facing the outlet port, whereby said piston in a first position prevents mixing of said critical fluid with fluid on the side of the piston facing the inlet port until said piston moves to the second position.

4,504,266

VARIABLE ASPIRATION DRAINING INSTRUMENT

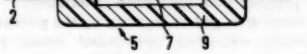
Anton Härle, Schelmenstiege 8, D-4400 Münster, Fed. Rep. of Germany, assignor to Anton Härle, Münster, Fed. Rep. of Germany

Division of Ser. No. 215,687, Dec. 12, 1980, abandoned. This application Mar. 18, 1983, Ser. No. 475,469

Claims priority, application Fed. Rep. of Germany, Dec. 14, 1979, 2950323

Int. Cl.³ A61M *1/00*

U.S. Cl. 604—118 **6 Claims**



1. An aspirator for use during a surgical procedure to remove flowable material from a surgical wound, said aspirator comprising a tubular body having a first end and a second end

and a passage between said ends, said first end having a first opening for connecting said passage with a source of suction and said second end having a second opening for the withdrawal of flowable material from the wound, said passage communicating with the exterior of said body only via said openings; a tubular member extending through said first opening and having a sloping end face disposed in said passage; and regulating means on said body for regulating the suction in said passage when the latter is connected to a source of suction, said regulating means including a valve member movable between an open position in which said valve member is remote from said sloping end face and in which said second opening communicates with said first opening, and a closed position in which said valve member sealingly engages said sloping end face and such communication is interrupted, and said regulating means further including a manually operated actuating member for moving said valve member from said closed position to said open position, said valve member being biased toward said closed position and capable of moving from said open position to said closed position substantially under the action of aspirated air in said passage when said actuating member is released.

4,504,267

APPARATUS FOR INTRAVENOUS INJECTION OF LIQUIDS

William H. Parmelee, 5036 W. Library Rd., Bethel Park, Pa. 15102, and Roger D. Sutton, 360 Avon Dr., Pittsburgh, Pa. 15228

Filed Nov. 28, 1980, Ser. No. 211,256
Int. Cl.³ A61M *5/00*
U.S. Cl. 604—134 **18 Claims**

1. In an apparatus for the prolonged intravenous injection of liquid into the body of a patient from a flexible plastic flask having a discharge connection at one end with which one end of a flexible tube is connected, the tube, in turn, having a discharge terminal at its other end, the invention comprising:

(a) a horizontally elongate four-sided rigid casing of a length, width and depth to recive the flask and having an open end through which the discharge end of the flask is accessible when the container is positioned lengthwise within the casing;

(b) means in the casing for applying pressure to the flask for collapsing the flask and expelling the liquid therefrom under pressure from the discharge terminal;

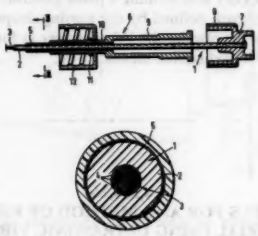
(c) a garment arranged to be worn by the patient having a horizontally extending open-ended pouch removably receiving the casing with the flask therein in a generally horizontal position with its discharge connection selectively accessible at the right or left end of the pouch, the garment being constructed to support the weight of the pouch from the shoulders of the patient when the patient's torso is erect.

4,504,268

STIFFENING CORE FOR A CATHETER TUBE

Gerhard Herlitze, Baunatal, Fed. Rep. of Germany, assignor to Intermedicate GmbH, Emmenbrucke, Switzerland

Filed Nov. 2, 1982, Ser. No. 438,458
Claims priority, application Fed. Rep. of Germany, Nov. 10, 1981, 8132839[U]
Int. Cl.³ A61M *25/00*
U.S. Cl. 604—170 **12 Claims**



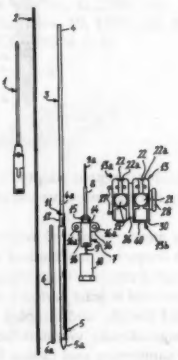
1. Catheter apparatus comprising a tubular catheter and a stiffening core, said catheter having a lumen, said stiffening core comprising a cylindrical plastic rod, said rod being disposed in said lumen in gap-free relationship therewith and being slidably removable from said lumen, said rod comprising at least one resilient multifilament strand of high tensile strength and uniform diameter fixedly embedded therein.

4,504,269

DEVICE FOR CATHETERIZATION IN PARTICULAR FOR PERFUSIONS IN THE MEDICAL AND VETERINARY FIELDS

Alain J. Durand, Parc à Ballons, Résidence Oméga, F-34000 Montpellier, France

Filed Mar. 1, 1983, Ser. No. 471,211
Claims priority, application France, Mar. 5, 1982, 82 03674
Int. Cl.³ A61M *5/00*
U.S. Cl. 604—272 **3 Claims**



1. A catheterization device which can be employed for perfusions in the medical and veterinary fields, comprising a flexible-tube catheter and means for "tunnelizing" the catheter tube beneath the patient's skin over a predetermined distanced between a point of puncture of a blood vessel and the external surface of the patient's skin, and further comprising a connector for joining the outer end of the flexible catheter tube to an external supply pipe, said connector having a hollow body provided with an extension in the form of a rigid tubular portion adapted to permit insertion of said portion within the

flexible tube, wherein said connector is fitted with a clamp which is capable of tightly applying the end portion of said flexible tube against said rigid tubular portion in order to prevent any relative sliding motion between said flexible end portion and said rigid portion, said clamp being formed by a casing which consists of two half-elements pivotally mounted on a hinge, one half-element being provided at one end with a flange pierced by an opening through which the connector body is passed, said flange being adapted to fit within a groove formed in said connector body so as to ensure that the connector is securely fixed to the clamp as a result of closing of said casing.

4,504,270

ENEMA APPARATA IMPROVEMENTS RELATING TO DOUBLE CONTRAST STUDIES

Roscoe E. Miller, 7400 W. 88th St., Indianapolis, Ind. 46278

Division of Ser. No. 347,900, Feb. 11, 1982, Pat. No. 4,419,099, which is a continuation-in-part of Ser. No. 131,965, Apr. 4, 1980, Pat. No. 4,333,460, which is a continuation-in-part of Ser. No. 39,502, May 16, 1979, abandoned. This application Mar. 30, 1983, Ser. No. 470,246

Int. Cl.³ A61B *5/00*

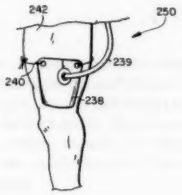
U.S. Cl. 604—275 **4 Claims**

1. A contrast medium system for use with an insertion member for delivering to a patient and receiving from the patient, after delivery, a dosage of a suitable contrast medium, said contrast medium system comprising:

a contrast medium receptacle defining an inner cavity and being designed and arranged to retain therein a dosage of a suitable contrast medium;

a dosage of a suitable contrast medium premixed and initially disposed within the inner cavity of said contrast medium receptacle;

conduit means suitably designed and arranged for establishing flow communication with the inner cavity of said contrast medium receptacle and being suitably designed and adapted for flow coupling to said insertion member; and



attachment means cooperatively arranged with said contrast medium receptacle for securing said contrast medium receptacle to a portion of the patient's anatomy at a location below the patient's rectum.

4,504,271

LEATHER TANNING AGENT AND PROCESS FOR MAKING SAME

David L. Motov, ulitsa Fersmana, 18, kv. 19; Ljudmila P. Tjurkina, ulitsa Severnaya, 19, kv. 90; Maria M. Godneva, ulitsa Fersmana, 18, kv. 19, all of Apatity, Murmanskaya oblast; Nina I. Kolesnikova, ulitsa 15 Parkovaya, 23, kv. 20, Moscow; Galina G. Yakusheva, ulitsa Shkolnaya, 76, kv. 29, Vidnoe, Moskovskaya oblast, all of U.S.S.R.; Metelkin A. Ivanovich, deceased, late of Moscow, U.S.S.R., and by Chibisova N. Fedorovna, administrator, ulitsa Nagornaya, 24, korpus 6, kv. 31, Moscow, U.S.S.R.

PCT No. PCT/SU81/00043, § 371 Date Jan. 18, 1983, § 102(e) Date Jan. 18, 1983, PCT Pub. No. WO82/04071, PCT Pub. Date Nov. 25, 1982

PCT Filed May 19, 1981, Ser. No. 460,235

Int. Cl.³ C14C *3/04*

U.S. Cl. 8—94.25 15 Claims

1. A process for producing a leather tanning agent, comprising reacting (a) solution containing 80 to 200 g/l of titanium, as calculated for its dioxide, with (b) a solution of aluminum sulphate containing from 80 to 130 g/l of aluminum, as calculated for its oxide, and (c) a solution of zirconium sulphate containing 50 to 200 g/l of zirconium, as calculated for its dioxide, in the presence of sulphuric acid and ammonium sulphate.

4,504,272

SHADING PROCESS USING POLY-FUNCTIONAL REACTIVE AND NON-REACTIVE DYESTUFFS BONDED IN FIXING

Sienling Ong, Hofheim am Taunus, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed Dec. 21, 1983, Ser. No. 564,017

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1982, 3247727

Int. Cl.³ C09B *62/00, 67/24;* D06P *1/38*

U.S. Cl. 8—543 10 Claims

1. In a process for adjusting dyeing recipes in order to dye a shade which is not directly accessible by the normal practice of starting from trade products which dye in a single hue, by having recourse to combinations of components which do not have identical hues and which, when applied to textile substrates containing hydroxyl and/or carboxamide groups, are capable of forming, in the course of a fixing operation at ordinary or elevated temperatures and under the influence of acid-binding agents, homopolar bonds with the said groups of the fiber substance, the improvement which comprises selecting dyestuff mixtures which are comprised of:

(a) at least one water-soluble, polyfunctional reactive dyestuff, the molecule of which contains two or more, optionally different, fiber-reactive groupings, or which is capable of forming two or more such groupings under the influence of an acid-binding agent when dyeing or printing the textile material, and

(b) at least one water-soluble dyestuff which is not of itself fiber-reactive, the molecule of which contains, or is capable of making available under the influence of an acid-binding agent when dyeing or printing the textile material, one or more reactive hydrogen atoms.

4,504,273

REACTIVE DYES, PROCESS FOR THEIR PREPARATION AND USE THEREOF

Rainer Begrich, Rheinfelden, Switzerland, and Jean-Francois Landré , Riedisheim, France, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

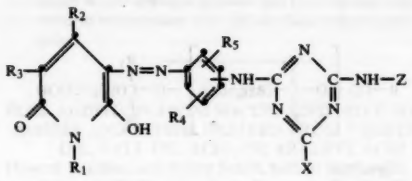
Filed Aug. 22, 1983, Ser. No. 525,368

Claims priority, application Switzerland, Aug. 25, 1982, 5055/82

Int. Cl.³ C09B *62/08;* D06P *3/66, 1/38*

U.S. Cl. 8—549 13 Claims

1. A reactive dye of the formula



wherein R_1 is hydrogen or unsubstituted or substituted C_1–C_4alkyl or phenyl, R_2 is hydrogen or unsubstituted or substituted C_1–C_4alkyl, R_3 is hydrogen, cyano, carbamoyl or sulfomethyl, R_4 and R_5 are each independently hydrogen, C_1–C_4alkyl, C_1–C_4alkoxy, halogen, carboxy or sulfo, X is fluorine, chlorine or bromine, and Z is an unsubstituted or substituted benzthiazolyl-(2)-phenyl radical.

4,504,274

ENRICHMENT OF LOW GRADE COALS

Ardis L. Anderson, Ponca City, Okla., assignor to Conoco Inc., Ponca City, Okla.

Filed Sep. 22, 1983, Ser. No. 534,958

Int. Cl.³ C10L *9/08, 9/10*

U.S. Cl. 44—6 6 Claims

1. A process for enrichment of low grade coal comprising

(a) grinding said coal to a particle size no greater than about ¼ inch in diameter;

(b) contacting the coal of (a) with hot coal char having a temperature of from about 600° F. to about 1200° F. to form an intimate mixture thereof and passing said mixture into a turbulent drying means to provide an exiting coal stream and an off gas/fines stream;

(c) separating the coal exiting said dryer means . into two portions

(1) a first portion passing through a heat exchanger to cool said stream and provide heated air and product coal and

(2) a second portion passing into a turbulent burner zone, wherein said portion is partially combusted with heated air from (1) to form (i) hot char having a temperature of from about 600° F. to about 1000° F., (ii) off gases which are recycled to (b) and (iii) fines which are sent to separation;

(d) separating the off gases and fines of (2), the off gases utilized to further dry the low grade coal and the fines recycled for further combustion;

(e) separating the off gas/fine stream of (d) into flue gas and fines, wherein the fines are added to the product coal stream.

4,504,275

EMULSIFYING AGENTS

Alan S. Baker, Slough, England, assignor to Imperial Chemical Industries PLC, London, England

Filed Mar. 24, 1983, Ser. No. 478,480

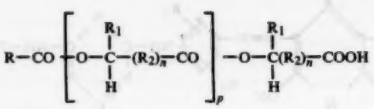
Int. Cl.³ C10L *1/32*

U.S. Cl. 44—51 12 Claims

1. A surfactant composition suitable for the emulsification of methanol or ethanol in a hydrocarbon liquid, the composition being a blend of:

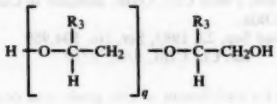
(i) from 10% to 90% by weight of a block or graft ccpolymer having the general formula $(A—COO)_m—B$, wherein m is an integer at least 2, wherein each polymeric ccmponent A has a molecular weight of at least 500 and is the residue of an oil-soluble complex monocarboxylic acid having the general structural formula

(I)



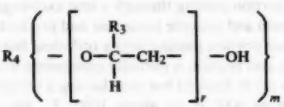
in which
R is hydrogen or a monovalent hydrocarbon or substituted hydrocarbon group;
R_1 is hydrogen or a monovalent C_1 to C_{24} hydrocarbon group;
R_2 is a divalent C_1 to C_{24} hydrocarbon group;
n is zero or 1;
p is an integer from zero up to 200;
and wherein each polymeric component B has a molecular weight of at least 500 and, in the case where m is 2, is the divalent residue of a water-soluble polyalkylene glycol having the general formula

(II)

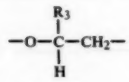


in which
R_3 is hydrogen or a C_1 to C_3 alkyl group;
q is an integer from 10 up to 500;
or in the case where m is greater than 2, is the residue of valency m of a water-soluble polyether polyol having the general formula

(III)



in which
R_3 and m have their previous significance;
r is zero or an integer from 1 to 500, provided that the total number of



units in the molecule is at least 10;
R_4 is the residue of an organic compound containing in the molecule m hydrogen atoms reactive with a alkylene oxide;
with (ii) from 90% to 10% by weight of a conventional non-ionic surfactant in which the oil-soluble component has a molecular weight below 500 and which has an HLB value in the range 11.0 to 18.0.

9. An emulsion of methanol or ethanol in a liquid hydrocarbon fuel, the emulsion containing from 1% to 75% by weight of methanol or ethanol as the disperse phase and from 25% to 99% by weight of the hydrocarbon fuel as the continuous phase, and in addition, as emulsifying agent, from 1% to 100% by weight, based on the disperse phase, of a surfactant composition as claimed in claim 1.

4,504,276

EMULSIFYING AGENTS

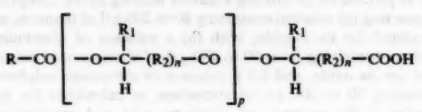
Alan S. Baker, Slough, England, assignor to Imperial Chemical Industries PLC, London, England

Filed Mar. 24, 1983, Ser. No. 478,481
Int. Cl.³ C10L 1/32
U.S. Cl. 44—51 12 Claims

1. A surfactant composition suitable for the emulsification of methanol or ethanol in a hydrocarbon liquid, the composition being a blend of:

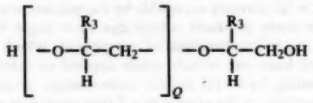
(i) from 10% to 90% by weight of a block or graft copolymer having the general formula $(A—COO)_m—B$, wherein m is an integer at least 2, wherein each polymeric component A has a molecular weight of at least 500 and is the residue of an oil-soluble complex monocarboxylic acid having the general structural formula

(I)



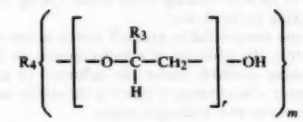
in which
R is hydrogen or a monovalent hydrocarbon or substituted hydrocarbon group;
R_1 is hydrogen or a monovalent C_1 to C_{24} hydrocarbon group;
R_2 is a divalent C_1 to C_{24} hydrocarbon group;
n is zero or 1;
p is an integer from zero up to 200;
and wherein each polymeric component B has a molecular weight of at least 500 and, in the case where m is 2, is the divalent residue of a water-soluble polyalkylene glycol having the general formula

(II)

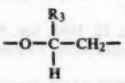


in which
R_3 is hydrogen or a C_1 to C_3 alkyl group;
q is an integer from 10 up to 500;
or in the case where m is greater than 2, is the residue of valency m of a water-soluble polyether polyol having the general formula

(III)



in which
R_3 and m have their previous significance;
r is zero or an integer from 1 to 500, provided that the total number of



units in the molecule is at least 10;
R_4 is the residue of an organic compound containing in the

molecule m hydrogen atoms reactive with an alkylene oxide;

with (ii) from 90% to 10% by weight of the salt of an aliphatic amino compound with a long-chain aliphatic carboxylic acid.

9. An emulsion of methanol or ethanol in a liquid hydrocarbon fuel, the emulsion containing from 1% to 75% by weight of methanol or ethanol as the disperse phase and from 25% to 99% by weight of the hydrocarbon fuel as the continuous phase, and in addition, as emulsifying agent, from 1% to 100% by weight, based on the disperse phase, of a surfactant composition as claimed in claim 1.

4,504,277

COAL-WATER FUEL SLURRIES AND PROCESS FOR MAKING SAME

Robert S. Scheffee, Lorton, Va., assignor to Atlantic Research Corporation, Alexandria, Va.

Continuation-in-part of Ser. No. 368,921, Apr. 16, 1982, , which is a continuation-in-part of Ser. No. 197,853, Oct. 17, 1980, abandoned, and Ser. No. 360,523, Mar. 22, 1982, Pat. No. 4,465,495. This application Apr. 13, 1983, Ser. No. 484,671

Int. Cl.³ C10L *1/32*

U.S. Cl. 44—51 **21 Claims**

1. A coal-water fuel slurry which comprises:

a. finely-divided coal having a particle size distribution within efficient combustion size range, said coal being in amount sufficient to provide a desired coal concentration in the slurry;

b. a minor amount of anionic ammonium salt organic dispersant sufficient to reduce substantially viscosity of the slurry;

c. a minor amount of anionic alkaline earth metal salt organic dispersant sufficient to produce a slurry yield point larger than that obtained with said ammonium salt alone and to maintain the slurry in stable static dispersion; and

d. water in amount sufficient to provide the liquid carrier for the slurry.

4,504,278

CORROSION INHIBITED MOTOR FUEL

Rodney L. Sung, Fishkill, N.Y., assignor to Texaco Inc., White Plains, N.Y.

Filed Jun. 27, 1984, Ser. No. 625,167

Int. Cl.³ C10L *1/22*

U.S. Cl. 44—53 **26 Claims**

1. A fuel composition for internal combustion engines comprising

(a) a major portion of fuel containing (i) at least one alcohol selected from the group consisting of ethanol and methanol and (ii) gasoline in amount of 0–50 volumes per volume of alcohol; and

(b) a minor corrosion inhibition amount of, as a corrosion inhibiting agent, the reaction product in polar solvent of (i) isatoic anhydride and (ii) di-hydrocarbyl secondary amine with (iii) a hydrocarbonoxy, hydrocarbyl primary amine further reacted at ambient temperature.

4,504,279

CORROSION INHIBITED MOTOR FUEL

Rodney L. Sung, Fishkill, N.Y.

Filed Jul. 9, 1984, Ser. No. 628,935

Int. Cl.³ C10L *1/22*

U.S. Cl. 44—53 **28 Claims**

1. A fuel composition for internal combustion engines comprising

(a) a major portion of a fuel containing (i) at least one alcohol selected from the group consisting of ethanol and methanol and (ii) gasoline in amount of 0–50 volumes per volume of alcohol; and

(b) a minor corrosion inhibition amount of, as a corrosion inhibiting agent, a reaction product in polar solvent of (i) isoatoic anhydride and (ii) a sterically hindered primary amine which reaction product has been further reacted at ambient temperature with (iii) an alkoxyalkylaminoalkylamine.

4,504,280

FUEL ADDITIVES FROM SO_2 TREATED MIXTURES OF AMIDES AND ESTERS DERIVED FROM VEGETABLE OIL, TALL OIL ACID, OR ARALKYL ACID

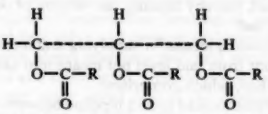
Howard F. Efner, and Sidney Schiff, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 524,008, Aug. 17, 1983,. This application Jun. 27, 1984, Ser. No. 625,338

Int. Cl.³ C10L *1/24*

U.S. Cl. 44—63 **48 Claims**

1. A composition useful as a detergent additive composition useful in the treatment of fuels comprising: reacting multiamine with compounds chosen from the group consisting essentially of (1) tall oil acid, (2) phenylstearic acid and (3) vegetable oil to obtain a first product mixture, said vegetable oil selected from among triglycerides of long-chain monocarboxylic acids of the formula



where R is an aliphatic radical of about 10 to about 25 carbon atoms, said first product mixture further reacted with SO_2 to obtain a second product mixture.

4,504,281

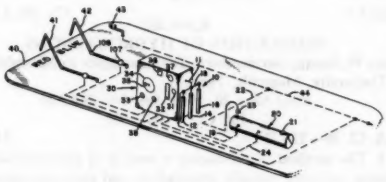
ODORANT INJECTION APPARATUS

Benjamin J. Williams, Jr., Houston, Tex., and Robert G. Hodge, Petal, Miss., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Continuation of Ser. No. 339,252, Jan. 31, 1982, abandoned. This application Aug. 16, 1983, Ser. No. 523,917

Int. Cl.³ C10L *10/00*

U.S. Cl. 48—195 **6 Claims**



1. An apparatus for odorizing LPG, comprising:

(a) a pressurization means for supplying a pressurized gas;

(b) tank for storing odorant under gas pressure directed from said pressurization means, said tank means having an interconnecting pipeline between said pressurization means and the top of said tank means to pressurize said odorant with said pressurized gas and provide an isolating blanket of said gas on top of said odorant, which limits the amount of odorant vented therefrom;

(c) level pot means for measuring and holding a portion of odorant delivered thereto through a pipeline interconnecting said tank means to the bottom of said level pot means, said level pot means having an interconnecting pipeline between said pressurization means and the top of said level pot means to provide an isolating blanket of said gas on top of said odorant that limits the amount of odorant vented therefrom, further having an interconnecting

pipeline from the top of said level pot means to a vent pipeline connected directly to a vapor return line, and having a pipeline interconnecting the bottom of said level pot means to a LPG loading pipeline;

(d) first switch means for drawing a measured portion of said odorant from said tank means into said level pot means, which comprises:

a first valve located in said pipeline between said tank means and said level pot means,

a second valve located in said pipeline between the top of said level pot means and said vent pipeline,

a first manually operated switching means connected to selectively direct gas flow from said pressurization means to operate a first pneumatic, valve actuator,

a first four-way valve, which is actuated by said first pneumatic actuator, and which is connected to direct gas flow from said pressurization means, and

a second pneumatic, valve actuator, which is connected to receive a gas flow directed from said first four-way valve and which is configured to simultaneously actuate said first and second valves to maintain said gas blanket in said level pot means during the filling thereof with odorant, thereby limiting the venting of odorant therefrom; and

(e) second switch means for supplying said measured portion of odorant from said level pot means into said LPG loading pipeline, which comprises:

a third valve located in said pipeline between said pressurization means and said level pot means,

a fourth valve located in said pipeline between the bottom of said level pot means and said LPG loading pipeline,

a second manually operated switching means connected to said pressurization means for flowing gas therefrom to operate a third pneumatic, valve actuator,

a second four-way valve, which is actuated by said third pneumatic actuator and which is connected to direct gas flow from said pressurization means, and

a fourth pneumatic, valve actuator, which is connected to receive a gas flow directed from said second four-way valve and which is configured to simultaneously actuate said third and fourth valves, thereby flowing odorant from said level pot means to said LPG loading pipeline.

4,504,282

PRODUCTION OF HYDROCARBONS

John W. Smith, Germantown, Tenn., assignor to Memphis State University, Memphis, Tenn.

Filed May 20, 1981, Ser. No. 266,388
Int. Cl.³ C10J 3/00
U.S. Cl. 48—197 R **8 Claims**

1. The method of producing a source of gaseous fuel comprising reducing metallic manganese and carbonaceous material to powder finer than 200 mesh, mixing said manganese powder and carbonaceous material, and heating said mixture, in a reducing atmosphere, to a temperature not less than 600° nor more than 950° C. to substantial equilibrium by completion of reaction.

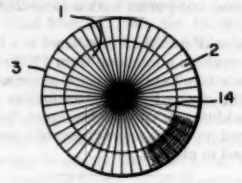
4,504,283

CUSHIONED ABRASIVE ARTICLES, AND METHOD OF MANUFACTURE

Vernon K. Charvat, Bay Village, Ohio, assignor to Superior Finishers, Incorporated, Valley View, Ohio

Continuation-in-part of Ser. No. 399,592, Jul. 22, 1982,. This application Sep. 30, 1982, Ser. No. 431,103
Int. Cl.³ C08G 5/12
U.S. Cl. 51—298 **24 Claims**

1. A slightly resiliently yielding abrasive article comprising a quantity of fine discrete abrasive particles having a size of at least as fine as 700 mesh bonded together in an elastomeric resin binder, said particles being sufficiently densely concentrated in said binder to afford a Shore D Hardness of from 70 to 100 at the working face of said article.

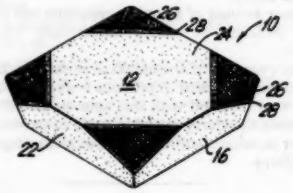


4,504,284

INDEXABLE COMPOSITE CUTTING INSERT HAVING CORNER CUTTING EDGES

John M. Ohno, Plymouth, Mich., assignor to General Electric Company, Detroit, Mich.

Filed Jul. 24, 1981, Ser. No. 286,613
Int. Cl.³ B24D 3/02
U.S. Cl. 51—309 **9 Claims**



1. A cutting insert comprising a body of polygonal configuration having spaced upper and lower surfaces, said body member having side walls extending between said upper and lower surfaces, said body member having a core comprised of a filler, carbon fiber and carbon black, and at least one cutting edge portion disposed at a corner of said body member defined by the intersection of two of said side walls and said upper or lower surface, with said cutting edge portion being made of diamond or cubic boron nitride crystals and united to said core by an α- or β-silicon carbide, or mixtures thereof, and Si matrix said core being essentially free of diamond or cubic boron nitride crystals.

4,504,285

SEPARATION OF CONDENSIBLE VAPORS FROM GAS MIXTURES

Jerry L. Modisette, Houston, Tex., assignor to Modisette Incorporated, Houston, Tex.

Filed Apr. 15, 1983, Ser. No. 485,233
Int. Cl.³ B01D 53/22, 53/24
U.S. Cl. 55—16 **15 Claims**

1. Apparatus for separating condensible vapors from a gas mixture comprising:

an expansion chamber of circular cross-section having a tangential inlet by which high pressure gas mixtures are admitted thereto for swirling movement, expansion and cooling therein, one end of said expansion chamber terminating in a converging nozzle section through the throat of which said cooled gas mixture exits said expansion chamber;

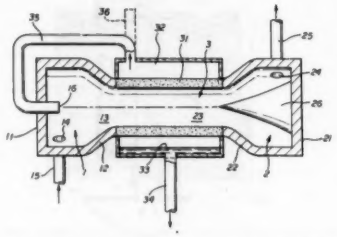
a tubular separator connected to said expansion chamber and into which said cooled gas mixture passes from the throat of said expansion chamber, the walls of said tubular sepa-

rator having perforations therein through which vapors condensed from said gas mixture in said cooling thereof may pass; and

a diffuser chamber of circular cross-section the entrance of which is formed by a diverging nozzle section through the throat of which gases separated from said condensed vapors in said tubular separator pass into said diffuser chamber for recompression and exhausting through a tangential outlet provided therein.

11. A method of separating condensible vapors from a gas mixture comprising the steps of:

introducing relatively high pressure gas and condensible



vapors into a chamber of circular cross-section for swirling movement therein;

isentropically expanding and cooling said gas and condensible vapors to convert said condensible vapors to liquid while increasing the velocity thereof by passing said gas and entrained liquids through a converging nozzle;

passing said cooled gas and entrained liquids, resulting from said cooling, through a perforated walled tubular member, said entrained liquids passing through said perforated wall for separation from said gas; and

isentropically compressing the gas from which said liquids have been separated by passing said gas through a diverging nozzle.

4,504,286

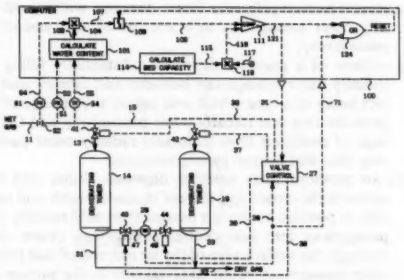
AUTOMATIC DRYING TOWER SWITCHING SYSTEM

Thomas A. Carlisle; Phillip R. Smith, both of Bartlesville, Okla., and Frank H. Thorn, deceased, late of Bartlesville, Okla. (by Carl L. Thorn, Ernest F. Thorn, Alexandra L. Thorn, heirs), assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 25, 1984, Ser. No. 603,857

Int. Cl.³ B01D *53/04*

U.S. Cl. 55—20 **10 Claims**



6. A method for controlling the switching of the flow of a wet gas between first and second dehydrating towers, wherein said wet gas is provided through a first valve to said first dehydrating tower and through a second valve to said second dehydrating tower, wherein said first valve is open to allow said wet gas to flow through said first dehydrating tower to dry said wet gas and wherein said second valve is closed to prevent said wet gas from flowing through said second dehydrating tower while said wet gas is flowing through said first dehydrating tower, said method comprising the steps of:

establishing a first signal representative of the presence of an unacceptable water content at the fluid outlet of said first dehydrating tower, wherein the presence of an unacceptable level of water indicates that the capacity of said first dehydrating tower has been exceeded;

closing said first valve and opening said second valve in response to said first signal when said first signal indicates that an unacceptable concentration of water is present in the gas withdrawn from said first dehydrating tower;

establishing a second signal representative of the total amount of water which has been removed by said first dehydrating tower since the time said first valve was opened to allow wet gas to flow to said first dehydrating tower;

establishing a third signal representative of the maximum desired amount of water which can be provided to said first dehydrating tower;

comparing said second signal and said third signal and establishing a fourth signal which indicates when said second signal equals or exceeds said third signal; and

closing said first valve and opening said second valve when said fourth signal indicates that said second signal has exceeded said third signal, wherein said second signal will exceed said third signal only if the closing of said first valve and opening of said second valve in response to said first signal does not occur when an unacceptable concentration of water is present in the gas flowing from said first dehydrating tower.

4,504,287

METHOD OF PURIFYING A GAS MIXTURE CONTAINING UNDESIRABLE GAS COMPOUNDS

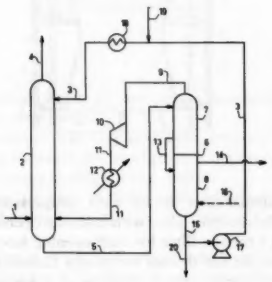
Martial Atlani, Paris; Roben Loutaty, Le Havre; Claude Wakselman, Villebon sur Yvette, and Charles Yacono, Le Havre, all of France, assignors to Compagnie Francaise de Raffinage and Agence Nationale de Valorisation de la Recherche (ANVAR), both of, France

Filed Sep. 13, 1982, Ser. No. 417,211

Claims priority, application France, Sep. 11, 1981, 81 17233

Int. Cl.³ B01D *19/00*

U.S. Cl. 55—53 **6 Claims**



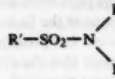
1. A method for purifying a gas mixture of hydrocarbons and/or hydrogen, said gas mixture additionally containing at least one undesirable gas compound selected from the group consisting of carbon monoxide, carbon dioxide, hydrogen sulfide, carbonyl sulfide and alkylthiols, comprising:

(a) in a first stage, absorption of said undesirable gas compounds in a solvent; and

(b) in a second stage, desorption of said undesirable gas compounds from solution, said solvent being character-

ized as containing at least one compound comprising a sulfonamide selected from the group consisting of:

(1) the compounds of the general formula:



(1)

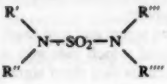
wherein R' is a saturated or unsaturated alkyl or aryl radical, R'' and R''' are hydrogen, saturated or unsaturated alkyl or aryl radicals; the alkyl radicals are linear or branched and have 1 to 18 carbon atoms,

—N-ethanesulfonylpyrrolidine,—N-ethanesulfonylpiperidine,—N-ethanesulfonylmorpholine,

—N-methylpropane sultam,—N-ethylpropane sultam

—N-butylpropane sultam and

a sulfamide having the general formula:



(2)

wherein R', R'', R''' and R'''' are linear or branched, saturated, the same or different, alkyl radicals, having 1 to 4 carbon atoms.

4,504,288

TUBULAR-FILTER DEVICE WITH COMPRESSED-AIR CLEANOUT

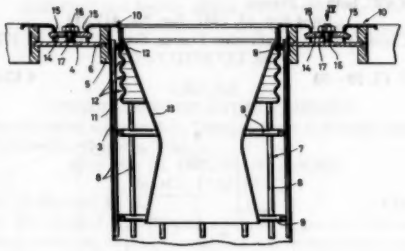
Rolf H. Kreft, Beckum, Fed. Rep. of Germany, assignor to Ventilatorenfabrik Oelde GmbH, Oelde, Fed. Rep. of Germany

Filed Dec. 12, 1983, Ser. No. 560,724

Claims priority, application Fed. Rep. of Germany, Apr. 29, 1983, 8312704[U]

Int. Cl.³ B01D *46/04*

U.S. Cl. 55—302 **4 Claims**



1. In a tubular-filter device with compressed-air cleanout having a tube-acceptor plate with insertion openings in the top thereof and a tubular filter for each opening having a resilient band around the top thereof for axially fastening same in the opening, the improvement comprising: a support basket in each filter having an upper radially sectioned ring; a filter-pot cover having a portion extending into the top of the tubular filter and support basket; means attaching the filter pot cover to the top of the tube-acceptor plate; and means disposed on the portion of the filter-pot cover that extends into the support basket and cooperative with the radially sectioned ring of the support basket to form a snap attachment for axially securing the upper ring of the support basket to the filter-pot cover in any one of a plurality of axial positions relative to the top of the tubular filter, whereby the tubular filter can be axially tensioned by moving the basket axially away from the fixed top of the filter.

4,504,289

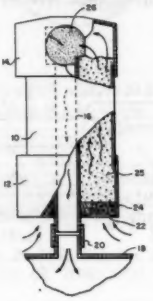
HYGROSCOPIC BREATHER CAP

James E. Waller, Madison, Tenn., assignor to Des-Case Corporation, Madison, Tenn.

Filed Jul. 15, 1983, Ser. No. 514,459

Int. Cl.³ B01D *53/04*

U.S. Cl. 55—316 **6 Claims**



1. A hygroscopic breather cap for a liquid petroleum tank comprising:

an air impervious cylindrical body closed at one end and having at the other end a central standpipe aperture and a plurality of peripheral apertures open to the atmosphere, said body having an air impervious standpipe communicating with said standpipe aperture at one end and extending from said standpipe aperture interiorly of said body to a point adjacent to but spaced from the closed end thereof to form an air impervious partition between a central passageway communicating with said central aperture and a radially outer passageway communicating with said plurality of peripheral apertures, so that air entering said body through said plurality of peripheral apertures is forced by said standpipe to travel substantially the height of said body through said radially outer passageway into the open end of said standpipe, and then substantially the length of said body through said central passageway before exiting said central aperture;

a first knitted polyester fabric disposed within said radially outer passageway at the air entry end thereof adjacent said plurality of peripheral apertures;

a second knitted polyester fabric disposed within said radially outer passageway adjacent the air exit end of said passageway;

a volume of a granular desiccant substantially filling said radially outer passageway between said fabrics, said fabrics being of a type which will inhibit the passage of dust particles into said radially outer passageway and the passage of desiccant fines from said radially outer passageway into said central passageway; and

an air pervious foam member disposed within said body adjacent the closed end thereof in contact with said standpipe in position so that air passing from said radially outer passageway into said central passageway passes therethrough, the surface area of the air exit end of said radially outer passageway being large relative to the surface area of the air entrance end of said central passageway,

whereby moist and dust-laden air entering said radially outer passageway passes through said first fabric where dust is removed, through said desiccant where moisture is removed, through said second fabric where desiccant fines are removed, and through said foam prior to entering the petroleum tank through said central passageway, to

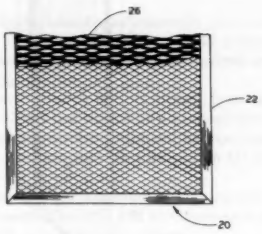
thereby reduce contamination of the petroleum within the tank from dust and water and the attendant oxidation of the interior wall of the tank.

4,504,290

ODOR FILTER MEDIA

Harold T. Pontius, Dublin, Ohio, assignor to Columbus Industries, Inc., Ashville, Ohio

Filed Jun. 14, 1984, Ser. No. 620,761
Int. Cl.³ B01D *53/04*
U.S. Cl. 55—316 **3 Claims**



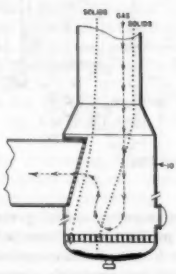
1. An improved gaseous filter media construction for odor control comprising, in combination, a non-woven sheet material consisting essentially of a combination of the following materials on a weight percent basis; at least 30 to 50 percent of cellulosic fibers and at least 1 to 10 percent of synthetic fibers selected from a group consisting of nylon, acrylic and polyester materials, the combination of said fibers representing at least approximately 40 percent of the total composition of said sheet material which includes 35 to 50 percent of activated carbon impregnated into the fibrous composition of said sheet and an amount of wet strength resin material sufficient to permit said sheet to be formed by a conventional paper making machines; said sheet material being provided with a plurality of expanded slits to form a plurality of adjacently disposed openings having a generally diamond-shaped configuration.

4,504,291

DROPOUT BOOT FOR POWER RECOVERY TRAIN

James H. Haddad, Princeton Junction, N.J., and Klaus W. Schatz, Philadelphia, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Jun. 29, 1983, Ser. No. 508,773
Int. Cl.³ B01D *45/08*
U.S. Cl. 55—319 **7 Claims**



1. A dropout boot for removing solid particles from a hot gas stream comprising:

an enclosed metal boot shell having an upper vertical inlet means adapted to receive hot gas from refractory lined gas conduit and having a

lower horizontal outlet means for passing hot clean gas to an energy recovery system or the like;

said boot shell having an upper flared portion adjacent the inlet means with outward and downwardly flared configuration whereby gas velocity is substantially reduced in the boot shell;

the interior of said boot being unobstructed except for a shell floor, an outlet grating and said outlet means;

said shell floor having open bottom horizontal baffle means for retaining solid particles from the gas;

said outlet means having an inwardly extending portion with an upper horizontal overhang protruding into the boot shell below the flared portion and inlet means;

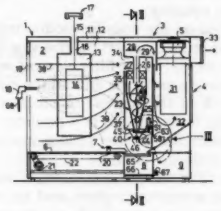
said outlet grating mounted over the horizontal outlet transversely of gas flow below the outlet overhand portion and sloped outwardly and downwardly therefrom.

4,504,292

POWDER SPRAY BOOTH

Gerhard F. Vöhringer, Friedrichshafen, Fed. Rep. of Germany, assignor to ESB Elektrostatische Sprüh- und Beschichtungsanlagen G.F. Vöhringer GmbH, Meersburg, Fed. Rep. of Germany

Filed Aug. 4, 1983, Ser. No. 520,195
Claims priority, application Fed. Rep. of Germany, Aug. 10, 1982, 3229756
Int. Cl.³ B01D *46/48;* B05C *15/00*
U.S. Cl. 55—325 **15 Claims**



1. A powder spray booth for spraying a workpiece with powder particles comprising:

a top wall, a bottom wall and side walls forming a spray coating space in which the workpiece is disposed;

a spray inlet opening through a side wall;

means to spray powder particles with a propellant gas through said spray inlet opening directed at the workpiece;

an outlet opening in a side wall of said booth opposite said spray inlet opening in the form of a slot extending across said side wall near said top wall;

a plurality of cyclone separators integral with said booth for producing aspiration of propellant gas with unused powder therein through said outlet opening;

aspiration inlet openings for said separators; and

at least one aspiration duct connecting said outlet opening with said aspiration inlet openings;

so that said propellant gas flows substantially level over the workpiece and then substantially upwardly through said slot opening and said separation inlet openings.

4,504,293

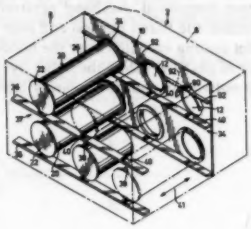
SELF-CLEANING AIR FILTER

Gary R. Gillingham, Prior Lake; Fred H. Wahlquist, Richfield, and Bernard A. Matthys, Apple Valley, all of Minn., assignors to Donaldson Company, Inc., Minneapolis, Minn.

Continuation-in-part of Ser. No. 386,617, Jun. 9, 1982, abandoned, Division of Ser. No. 364,535, Apr. 1, 1982, Pat. No. 4,452,616, Continuation of Ser. No. 204,579, Nov. 6, 1980, abandoned, Continuation-in-part of Ser. No. 20,477, Mar. 14, 1979, abandoned. This application Jun. 28, 1983, Ser. No. 508,562

Int. Cl.³ B01D *46/02, 46/42, 50/00*

U.S. Cl. 55—350 **8 Claims**



1. An improved air filter of the type in which at least one filter element is contained inside a housing and has opposed ends with one end thereof adapted to be sealed around an outlet opening provided in one wall of the housing, wherein the improvement relates to a means for supporting the filter element in the housing, which comprises:

two spaced and elongated support members contained in the housing and arranged to support respectively the opposed ends of the filter element, the filter element being laterally movable on the support members in a lateral direction relative to the support members towards and away from the outlet opening;

means carried on the housing for forcing the filter element supported on the support members in the lateral direction until the one end of the filter element engages the one wall of the housing and seals around the outlet opening;

wherein each of the support members includes means for seating the filter element in a position which is generally aligned with the outlet opening in the one wall of the housing; and

wherein the filter element is cylindrical and is adapted to roll along the support members and in which the seating means comprises arcuately shaped recesses located in each of the support members which recesses correspond to the shape of the periphery of the filter element, and wherein said recesses are laterally elongated to allow for the lateral movement of the filter element.

4,504,294

EXHAUST PROCESSOR ASSEMBLY

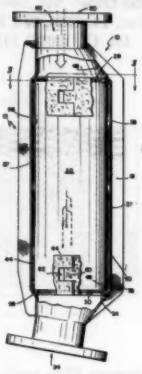
John C. Brighton, Columbus, Ind., assignor to Arvin Industries, Inc., Columbus, Ind.

Filed Jul. 8, 1983, Ser. No. 511,856

Int. Cl.³ B01D *46/00, 39/20;* **F01N** *3/02*

U.S. Cl. 55—502 **6 Claims**

1. An exhaust processor assembly comprising a housing, the housing including an inlet for introducing a combustion product into the housing and an outlet for exhausting combustion product from the housing, a particulate trap in the housing, the trap comprising a cellular structure having opposite ends, an outer wall extending longitudinally between said ends, and a plurality of permeable intermediate walls to provide a plurality of substantially parallel passages extending longitudinally therethrough from said inlet to said outlet, means for closing alternate passages at opposite ends of the trap such that combustion product entering a passage at the inlet end must pass through an intermediate wall to an adjacent passage to exit at the outlet end, a means for sealing the peripheral edge of the outer wall on at least one end of the trap, the sealing means comprising a resilient material positioned on the peripheral edge of said outer trap wall, the resilient material extending axially outwardly at least a predetermined distance beyond the cellular structure end to overlie a peripheral portion of the end



of the cellular structure and to block passage of combustion product through certain of the passages, and the housing further including a first clam shell portion, and a complementary second clam shell portion, the second clam shell portion being joined to the first clam shell portion to surround the cellular structure and to hold the resilient material in a position on the cellular structure whereby the flow of combustion product through said certain trap passages is prevented.

4,504,295

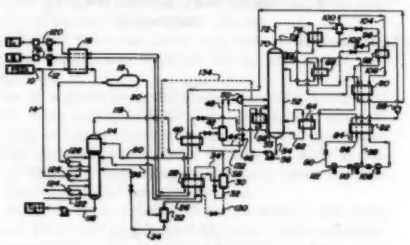
NITROGEN REJECTION FROM NATURAL GAS INTEGRATED WITH NGL RECOVERY

Ruth A. Davis, Whitehall; Donn M. Herron, Trexlertown; James W. Pervier, West Chester, and Harvey L. Vines, Emmaus, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Jun. 1, 1983, Ser. No. 499,954

Int. Cl.³ F25J *3/02*

U.S. Cl. 62—30 **14 Claims**



1. A process for the recovery at high pressure of a substantially pure nitrogen product, an ethane-rich product and a methane-rich product from a methane-containing feed stream wherein the feed stream has a variable concentration of nitrogen comprising:

(a) cooling a high pressure methane-containing feed stream comprising a variable nitrogen concentration of approximately 1 to 80 volume percent and separating said stream into an ethane-rich fraction and a nitrogen-rich fraction;

(b) heat exchanging the nitrogen-rich fraction against a methane-rich stream wherein both streams are at relatively high pressure and reducing the nitrogen-rich fraction in pressure at least in part through an expander before introducing said nitrogen-rich fraction into a first high pressure distillation column;

(c) driving said column with a closed loop heat pump refrigerant which condenses an overhead reflux stream, condenses an intermediate reflux stream and vaporizes a reboil stream to said distillation column wherein a portion of the refrigeration for the reflux of the column is produced by expanding the refrigerant through an expansion turbine;

(d) removing a high pressure, substantially pure nitrogen product as an overhead stream from said column and rewarming it against the closed loop refrigerant and portions of the feed stream;

(e) removing a methane-rich bottom stream from said column and introducing said stream into a second distillation column as reflux to recover additional hydrocarbon;

(f) introducing the ethane-rich fraction of step (a) into said second distillation column; and

(g) removing a methane-rich product at high pressure from the top of said second column and an ethane-rich product from the bottom of said second column.

11. An apparatus comprising elements designed, sized and arranged for the recovery at high pressure of a substantially pure nitrogen prodct, an ethane-rich product and a methane-rich product from a methane-containing feed stream wherein the feed stream has a variable concentration of approximately 1 to 80 volume percent nitrogen, including:

(a) heat exchange means for cooling said feed stream in order to partially condense the stream and to rewarm a methane-rich stream at high pressure;

(b) phase separator means for separating an ethane-rich liquid phase fraction from a nitrogen-rich vapor phase fraction;

(c) an expander for reducing the pressure and temperature on at least a portion of the nitrogen-rich fraction;

(d) a first distillation column operated at high pressure for the separation of a substantially pure nitrogen product as an overhead stream and a methane-rich bottom stream;

(e) a closed loop heat pump refrigeration cycle which drives the first distillation column, including an expansion turbine wherein a portion of the refrigeration for the reflux of said column is supplied;

(f) a second distillation column for the separation of the ethane-rich fraction of clause (b) and the methane rich bottom stream of clause (d) into a methane-rich product and an ethane-rich product.

4,504,296

DOUBLE MIXED REFRIGERANT LIQUEFACTION PROCESS FOR NATURAL GAS

Charles L. Newton, Bethlehem, and Wayne G. Stuber, Whitehall, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Jul. 18, 1983, Ser. No. 515,091
Int. Cl.³ F25J *1/02, 3/02*
U.S. Cl. 62—31 **15 Claims**

4. A process for precooling, liquefying and subcooling a methane-rich feed stream using two closed circuit, multicomponent refrigeration cycles comprising:

(a) precooling a gaseous superatmospheric methane-rich feed stream against a first multicomponent refrigerant comprising a binary mixture of propane and butane in portions selected to increase the overall efficiency of said process in a progressive series of heat exchanges in a first heat exchanger which provides cocurrent flow of the refrigerant phases without substantial backmixing of the liquid phase of the refrigerant with the vapor phase of the refrigerant wherein the refrigerant is cooled in a flash refrigeration cycle wherein the refrigerant is flashed to progressively lower temperatures and pressures;

(b) liquefying the precooled methane-rich stream in an initial heat exchange in a second heat exchanger against a second multicomponent refrigerant comprising nitrogen, methane, ethane, propane and butane wherein the refrigerant is cooled in a subcool refrigeration cycle by pressure reduction and heat exchange against itself;

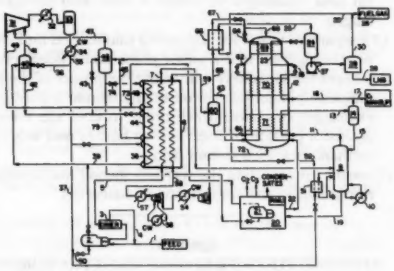
(c) subcooling the liquefied methane-rich stream in further heat exchange against the second multicomponent refrigerant in which the refrigerant has been cooled in a subcool refrigeration cycle,

(d) compressing said first multicomponent refrigerant to a pressure in the range of 75 to 250 psia and aftercooling the compressed refrigerant against an external cooling fluid;

(e) separating said first multicomponent refrigerant into a refrigerant sidestream and a remaining refrigerant stream which is reduced in pressure by flashing and which precools the methane-rich feed stream in said heat exchanger to a first relatively high temperature level before being recycled for recompression;

(f) reducing the pressure by flashing on the refrigerant sidestream and separating it into a vapor phase which is recycled to recompression and a liquid phase refrigerant;

(g) separating said liquid phase refrigerant of step (f) into a second refrigerant sidestream and a second remaining refrigerant stream which is reduced in pressure by flashing and further precools the methane-rich feed stream to an



intermediate temperature level in said heat exchanger before being recycled for recompression;

(h) reducing the pressure by flashing on the second refrigerant sidestream and separating it into a vapor phase which is recycled to recompression and a liquid phase refrigerant;

(i) further reducing the pressure by flashing on the liquid phase refrigerant of the second sidestream and precooling the methane-rich feed stream to a low temperature level in said heat exchanger before recycling the refrigerant to recompression;

(j) compressing the second multicomponent refrigerant of step (b) to a pressure in the range of 450 to 850 psia and aftercooling the same against an external cooling fluid;

(k) further cooling the second multicomponent refrigerant against the first multicomponent refrigerant in said first heat exchanger; and

(l) reducing the pressure on the second multicomponent refrigerant and heat exchanging the refrigerant against a portion of itself to cool it before passing it in heat exchange communication against the methane-rich feed stream to liquefy and subcool the latter and then recycling the refrigerant for recompression.

12. A system for precooling, liquefying and subcooling a methane-rich feed stream using two closed circuit, multicomponent refrigeration cycles comprising:

(a) a multistage plate and fin heat exchanger having elements designed, sized and arranged for receiving different tem-

perature levels of a first multicomponent refrigerant and having passageways for precooling a methane-rich feed stream against said refrigerant wherein said refrigerant comprises a binary mixture of propane and butane in which the heat exchanger allows for cocurrent flow of the refrigerant phases without substantial backmixing of the liquid phase with the vapor phase;

(b) a second multistage heat exchanger for liquefying and subcooling the methane-rich feed stream against a second multicomponent refrigerant;

(c) means for conveying the liquid methane-rich stream to storage or export;

(d) a multistage compressor for compressing the first multicomponent refrigerant to a pressure of 75 to 250 psia;

(e) an aftercooler for reducing the temperature of said compressed first multicomponent refrigerant to an initial lower temperature;

(f) means for conveying and flashing separate streams of said first multicomponent refrigerant at different reduced temperatures to said multistage plate and fin heat exchanger for precooling the feed stream in stages;

(g) means for recycling the warmed and vaporized first multicomponent refrigerant to said multistage compressor of clause (d);

(h) a compressor for compressing the second multicomponent refrigerant to a pressure in the range of 450 to 850 psia;

(i) means for conveying the compressed second multicomponent refrigerant through an aftercooler and the plate and fin heat exchanger in order to cool said refrigerant in stages;

(j) a separator vessel for separating said second multicomponent refrigerant into a vapor phase and a liquid phase;

(k) means for separately conveying the phases of the second multicomponent refrigerant to said second multistage heat exchanger of clause (b) in order to cool the refrigerant against a portion of itself and to liquefy and subcool the methane-rich feed stream; and

(l) means for recycling the warmed second multicomponent refrigerant to the compressor of clause (h).

4,504,297

OPTICAL FIBER PREFORM MANUFACTURING METHOD

Sandra G. Kosinski, New Providence; Paul J. Lemaire, Basking Ridge, and Paul B. O'Connor, Middlesex, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jul. 6, 1983, Ser. No. 511,142

Int. Cl.³ C03C *25/02*

U.S. Cl. 65—3.11 **9 Claims**

1. Method for manufacturing an optical fiber, the fiber having an operating wavelength and a loss at the operating wavelength, a core of diameter d, a first clad of outer diameter D surrounding the core, and a second clad surrounding the first clad, the material of the second clad derived from a pre-existing tube consisting substantially of silica having an initial OH-content greater than about 25 ppmw, the material of the core and the material of the first clad formed by means of a glass-forming reaction, the method for manufacturing the optical fiber comprising drawing the fiber from a glass body, to be termed a preform, the preform having been produced by a process comprising collapsing at least a part of a tubular body comprising the pre-existing tube, the preform being configured such that the fiber drawn therefrom has, at the operating wavelength, a substantially negligible loss due to OH diffused from the material of the pre-existing tube into the material formed by means of the glass-forming reaction, the method characterized in that

at least some of the material of the pre-existing tube is subjected, prior to collapse of the tubular body, to a deuterium/hydrogen exchange treatment, such that the OH-content of the material of the part of the pre-existing tube is reduced from the initial OH-content by at least about 50% or 100 ppmw, whichever is less.

4,504,298

PROCESS FOR PRODUCING INFRARED LIGHT TRANSMITTING OPTICAL FIBER

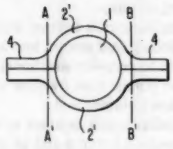
Minoru Yokota; Kazuhito Murakami, and Kenichi Takahashi, all of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 341,740, Jan. 22, 1980, abandoned. This application Oct. 19, 1983, Ser. No. 542,900

Claims priority, application Japan, Jan. 23, 1981, 56-9518; Jan. 26, 1981, 56-10554

Int. Cl.³ C03C *25/02*

U.S. Cl. 65—3.11 **20 Claims**



1. An improved process for producing a step-index infrared light transmitting optical fiber by drawing a rod of single crystal or polycrystalline silver halide, thallium halide, or a mixed crystal thereof into a fiber core through a die, forming around said fiber core an intimate cladding crystal layer having a lower refractive index than the core, wherein the improvement comprises plastic working the core and the cladding by rolling or drawing through a die in a temperature range that does not cause recrystallization of the core or cladding during working, whereby the crystal grains of the core and the crystal grains of the cladding crystal do not intermesh with each other and thereby retain their initial surface smoothness.

4,504,299

OPTICAL FIBER FABRICATION METHOD

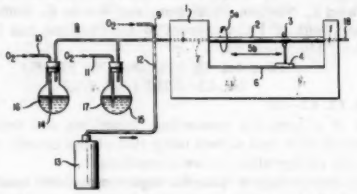
John B. MacChesney, Lebanon, and Paul B. O'Connor, Plainfield, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 382,401, May 26, 1982, abandoned, which is a continuation of Ser. No. 147,934, May 8, 1980, abandoned, which is a continuation of Ser. No. 828,617, Aug. 29, 1977, Pat. No. 4,217,027, which is a continuation of Ser. No. 444,705, Feb. 22, 1974, abandoned. This application Dec. 9, 1983, Ser. No. 559,729

The portion of the term of this patent subsequent to Aug. 12, 1997, has been disclaimed.

Int. Cl.³ C03B *37/07, 37/075*

U.S. Cl. 65—3.12 **5 Claims**



1. A process for fabrication of an optical fiber comprising a core section and a cladding, wherein the cladding has an index of refraction of a value lower than the maximum index of the core for energy of the wavelength to be transmitted comprising:

introducing a moving stream of a vapor mixture including at least one compound glass-forming precursor together with an oxidizing medium into a tube while heating the tube so as to react the said mixture and produce a glassy deposit on the inner surface of the tube,

collapsing the tube to a solid structure, and

drawing of solid structure into a fiber,

characterized in that

the heating of tube and contents are by a moving hot zone produced by a correspondingly moving heat source external to the tube,

temperature within the hot zone, composition of the vapor mixture, and rate of introduction of the vapor mixture are maintained at values such that at least a part of the reaction produces an oxidic reaction product particulate material, which deposits on the inner surface of the tube,

said particulate material is consolidated to produce said glassy deposit on the inner surface of the tube; and

glass precursor reactant vapors are maintained in the tube during at least a portion of the subsequent tube collapse.

4,504,300

DEVICE FOR MANUFACTURING AN OBJECT WITH CHIRALIC STRUCTURE FROM A SOURCE OF FORMABLE MATERIAL

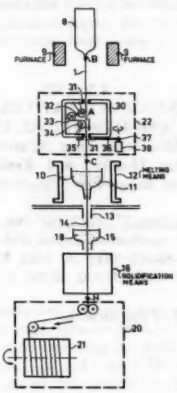
Francis Gauthier, Gif-sur-Yvette, and Jacques Dubos, Palaiseau, both of France, assignors to Thomson-CSF, Paris, France

Filed Dec. 7, 1983, Ser. No. 558,886

Claims priority, application France, Dec. 10, 1982, 82 20766

Int. Cl.³ C03B *37/025*

U.S. Cl. 65—10.1 **11 Claims**



1. A device for manufacturing an object with chiralic structure comprising a source of formable material forming a drawing volume, means for coating the object with an envelope playing the role of reinforcing sheath, followed by fast-cooling means for solidifying said envelope about said object, means for pulling said object from said drawing volume and means for twisting said object, wherein the means for twisting said object are disposed between the source and said coating means which are followed by fast-cooling means and pulling means.

4,504,301

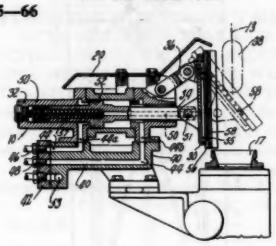
INDIVIDUALLY CONTROLLED INTERCEPTORS FOR GLASSWARE FORMING MACHINES

Wasyl Bystrianyk, 456 Bushy Hill St., Simsbury, Conn. 06070; Richard A. Walker, 11 Bradley Brook Dr., North Granby, Conn. 06060; Edward B. Gardner, 17 Loeffler Rd., Bloomfield, Conn. 06002, and Michael A. Iacovazzi, 155 Evelyn Rd., Bristol, Conn. 06010

Filed Sep. 30, 1982, Ser. No. 430,318

Int. Cl.³ C03B *7/16*

U.S. Cl. 65—66 **8 Claims**



1. In a glassware forming machine adapted to operate in conjunction with a plurality of gob sources,

a plurality of interceptor means, each associated with a predetermined one of said gob sources and

means operatively connected to said plurality of interceptor means for activating selected ones thereof to intercept the gobs associated therewith while simultaneously not activating others of said plurality of interceptor means.

8. A method of rejecting selected gobs from a group of gobs simultaneously delivered toward a section of a glassware forming machine, each gob within said group intended for delivery to a predetermined respective one of a plurality of molds in said section, comprising the steps of:

placing an interceptor adjacent the path of each one of said gobs;

selecting which of said molds is to not receive any gobs;

activating the interceptor associated with said selected mold to reject gobs intended for delivery thereto while simultaneously not activating the remaining interceptors to enable delivery of other gobs within the same group.

4,504,302

HOMOGENIZING APPARATUS GLASS MAKING FURNACE AND METHOD OF HOMOGENIZING GLASS

Justice N. Carman, 333 Escuela Ave., Apt. #129, Mountain View, Calif. 94040

Continuation-in-part of Ser. No. 1,134, Aug. 24, 1981, and a continuation-in-part of Ser. No. 315,851, Oct. 13, 1981, and a continuation-in-part of Ser. No. 381,331, May 24, 1982. This application Feb. 28, 1983, Ser. No. 490,979

Int. Cl.³ C03B *5/18*

U.S. Cl. 65—136 **12 Claims**

1. A homogenizing device for refining viscous liquid comprising:

a passageway for transmitting the viscous liquid,

a barrier in said passageway containing a plurality of narrow slits which provide the only route available through which the liquid can flow,

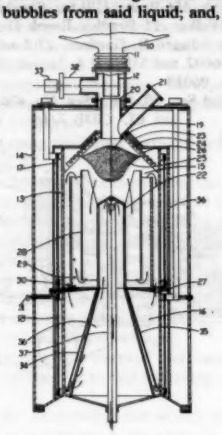
said barrier slits being formed of a uniform size having a width of between 10 and 150 micrometers; and

means to create a pressure differential along said passageway to force said viscous liquid through the passageway and through said narrow slits to cause high shear mixing and the separation of bubbles from said liquid.

10. The method of refining viscous liquids comprising the steps of:

providing a passageway for transmitting the liquids;

placing a barrier in said passageway comprising a solid walled member having a plurality of small slits therein of small enough size to cause high shear mixing and the separation of bubbles from said liquid; and,



causing a pressure differential along said passageway to cause said liquids to flow through said passageway and through said slits for mixing and separation of bubbles from said liquids.

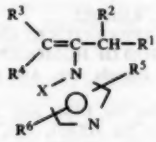
4,504,303

DERIVATIVES OF AZOLES HAVING PHYTOGROWTH REGULATING ACTIVITY

Mirella Cecere; Franco Gozzo, both of Milan, and Ernesto Signorini, Varese, all of Italy, assignors to Montedison S.p.A., Milan, Italy

Filed Mar. 16, 1983, Ser. No. 475,974
Claims priority, application Italy, Mar. 19, 1982, 20271 A/82
Int. Cl.³ A01N *43/50, 43/64;* C07D *233/60, 249/08*
U.S. Cl. 71—76 **9 Claims**

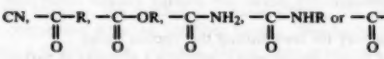
1. A compound of formula



(I)

in which

R^1 and R^2, the same or different are;



wherein R is a C_1–C_4 alkyl;

R^3 and R^4, the same or different, are a chlorine or bromine atom;

R^5 and R^6, the same or different, are a hydrogen atom or a C_1–C_5 alkyl;

X is a nitrogen atom or a CH group.

8. A method of limiting the growth of useful and ornamental plants, without damaging their vital functions, consisting in distributing on the plants or on the soil in which they grow, an effective but not phytotoxic amount of at least one of the compounds of claim 1, as such or in the form of suitable compositions or formulations.

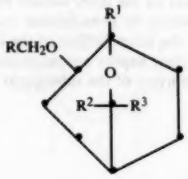
4,504,304

6-OXABICYCLO(3.2.2.)NONAN-4-OL ETHER HERBICIDES

Herbert Estreicher, and George B. Payne, both of Modesto, Calif., assignors to Shell Oil Company, Houston, Tex.

Filed Aug. 29, 1983, Ser. No. 527,045
Int. Cl.³ A01N *9/00;* C07D *313/08*
U.S. Cl. 71—88 **14 Claims**

1. A compound of the formula I



I

wherein R^1, R^2 and R^3 each independently is a hydrogen atom or an alkyl group containing from 1 to 10 carbon atoms and R is an ethynyl group, a cycloalkyl group containing from 3 to 10 carbon atoms, a cyclohexenyl group, a cyano group, a secondary alkyl group containing from 3 to 10 carbon atoms, a phenyl group optionally substituted by 1 or 2 chlorine or fluorine atoms or methyl groups, a naphthyl group, or heterocyclic group selected from a 2-pyridinyl, 2-pyrimidinyl, tetrahydro-2-pyranyl, imidazolyl, triazolyl, thiadiazolyl, 2-quinolinyl, 1-isoquinolinyl, pyrrolyl, N-methylimidazol-2-yl, N-methylpyrazol-2-yl, isoxazolyl, oxazolyl, isothiazolyl, thiazolyl, thienyl, 5-methyl-2-furanyl or triazinyl group.

10. A plant growth regulating composition comprising an effective amount of a compound according to claim 1 and at least one inert carrier or surface-active agent.

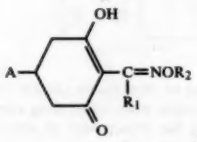
4,504,305

CYCLOHEXENONE DERIVATIVES, PREPARATION AND HERBICIDAL USE

Isao Iwataki; Akira Nakayama; Minoru Kaeriyama; Hisao Ishikawa; Hideo Hosaka, and Kenichi Kohara, all of Kanagawa, Japan, assignors to Nippon Soda Co., Ltd., Tokyo, Japan

Filed Dec. 27, 1982, Ser. No. 453,498
Claims priority, application Japan, Feb. 24, 1982, 57-28443; May 26, 1982, 57-88044; May 26, 1982, 57-88045
Int. Cl.³ A01N *31/00, 38/08, 47/28, 37/18*
U.S. Cl. 71—98 **15 Claims**

1. A compound of the formula

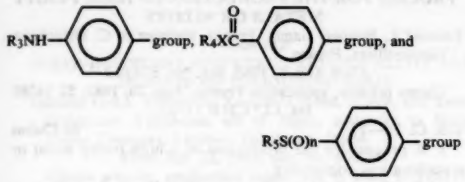


wherein

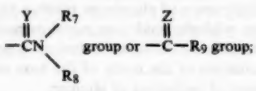
R_1 is alkyl having 1–3 carbon atoms;

R_2 is alkyl having 1–3 carbon atoms, allyl, propargyl or haloalkenyl; and

A is selected from the group consisting of a



wherein R_3 is $-SO_2R_6$ group,



R_4 is hydrogen, alkyl having 1–6 carbon atoms, phenyl or halophenyl; R_5 is alkyl having 1–3 carbon atoms; X is oxygen or sulfur; and n is 0 or 1; wherein R_6 is alkyl having 1–6 carbon atoms, haloalkyl having 1–6 carbon atoms or propenyl; R_7 is hydrogen or alkyl having 1–4 carbon atoms, R_8 is hydrogen, alkyl having 1–6 carbon atoms, propenyl or methoxy; R_9 is hydrogen, alkyl having 1–8 carbon atoms, haloalkyl having 1–3 carbon atoms, alkoxy having 1–6 carbon atoms, propenyl or phenyl substituted with methyl; and Y and Z are oxygen or sulfur; and a metal salt or a quaternary ammonium salt of a compound defined herein above.

8. A herbicidal composition comprising an inert carrier and an effective amount of a compound of claim 1.

4,504,306

METHOD OF PRODUCING AGGLOMERATES

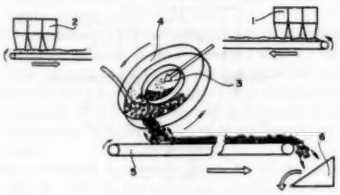
Tsuneo Miyashita; Noboru Sakamoto, and Hiroshi Fukuyo, all of Yokohama, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 390,380, Jul. 8, 1982, abandoned. This application Nov. 14, 1983, Ser. No. 550,732

Claims priority, application Japan, Jul. 10, 1981, 56-106869

Int. Cl.³ C22B *1/04, 1/20, 1/242*

U.S. Cl. 75—3 **5 Claims**



1. A method of producing agglomerates well suited for use in an iron producing blast furnace from a fine iron ore as a principal raw material, comprising the steps of:

adding a fluxing material and a solid fuel to a fine iron ore having a dominant particle size of less than 5 mm;

forming said material into first and second groups of pellets or briquettes of a size between 10 and 20 mmϕ, wherein each of said pellets or briquettes of the first and second groups is formed into a two-layer structure, said two-layer structure consisting of a core portion containing 0.3 to 1.0% by weight carbon and a shell portion containing 1.0 and 4.5% by weight carbon and wherein each of said pellets or briquettes of said first group contains 2 to 3% by weight of carbon and each of said pellets or briquettes of said second group contains between 0.5 and 1.0% by weight carbon;

charging said first and second groups of pellets onto a travelling grate-type furnace in an upper layer and a lower layer, said upper layer consisting of said first group of pellets or briquettes and said lower layer consisting of said second group of pellets; and

firing said pellets or briquettes in said travelling grate-type furnace including an updraft drying zone, a downdraft drying zone, an ignition zone and a suction burning zone.

4,504,307

METHOD FOR CARRYING OUT MELTING, MELT-METALLURGICAL AND/OR REDUCTION-METALLURGICAL PROCESSES IN A PLASMA MELTING FURNACE AS WELL AS AN ARRANGEMENT FOR CARRYING OUT THE METHOD

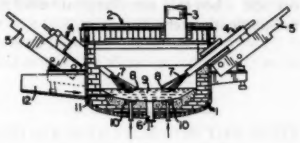
Walter Lugscheider; Othmar Steipe, both of Linz; Ernst Riegler, Enns, and Ernst Zajicek, Ottensheim, all of Austria, assignors to Voest-Alpine Aktiengesellschaft, Linz, Austria

Filed Feb. 1, 1984, Ser. No. 576,030

Claims priority, application Austria, Feb. 3, 1983, 366/83

Int. Cl.³ C22B *4/00*; C21C *5/52*

U.S. Cl. 75—10 R **12 Claims**



1. In a method for carrying out metallurgical processes in a plasma melting furnace having a furnace body formed by a bottom including a bottom electrode, a lid and side walls so as to define an inner space, and plasma burners guided through one of said lid and said side walls, by producing freely burning plasma torches of an original plasma gas between the mouths of said plasma burners and said bottom electrode and by charging at least one of fluxes to be melted and reactive substances to be reacted into the region of said plasma torches, the improvement which comprises injecting additional gas flows differing from said original plasma gas into said freely burning plasma torches at locations spaced at a distance from the mouths of said plasma burners so as to increase the energy input into a molten reaction bath formed and to regulate its temperature.

4,504,308

METHOD OF OPERATING A METALLURGICAL PLANT

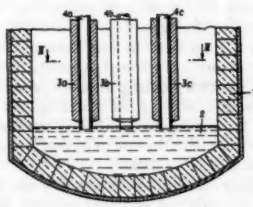
Rudolf Rinesch, Linz, Austria, assignor to Voest-Alpine Aktiengesellschaft, Linz, Austria

Filed Mar. 21, 1984, Ser. No. 591,696

Claims priority, application Austria, Apr. 6, 1983, 1209/83

Int. Cl.³ C22B *4/00*; C21C *5/52*

U.S. Cl. 75—10 R **7 Claims**



1. A method of operating a metallurgical plant including a metallurgical vessel having a ceiling, at least one hollow elec-

trode guided through said ceiling, said hollow electrode defining an electrode cavity and having an electrode mouth, and a supply pipe having a pipe mouth and being vertically displaceable in said electrode cavity, comprising the steps of

selectively operating said plant as one of an electric arc furnace, a plasma furnace and a refining converter by

disposing said supply pipe with said pipe mouth in said hollow electrode behind said electrode mouth, and supplying current to said electrode, when said metallurgical vessel is operated as an electric arc furnace for melting charging substances and fluxes,

disposing said supply pipe with said mouth in the region of said electrode mouth, supplying a plasma generating gas to said metallurgical vessel through said supply pipe, and supplying current to said electrode, when said metallurgical vessel is operated as a plasma furnace for melting charging substances and fluxes with an increased energy supply, and

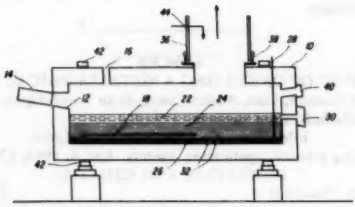
disposing said supply pipe with said supply mouth projecting outside said hollow electrode beyond said electrode mouth, and supplying oxygen-containing gas through said supply pipe without current being supplied to said electrode, when said metallurgical vessel is operated as a refining converter.

4,504,309

PROCESS AND APPARATUS FOR CONTINUOUS CONVERTING OF COPPER AND NON-FERROUS MATTES

Phillip J. Mackey, Pointe Claire, and J. Barry W. Bailey, Noranda, both of Canada, assignors to Noranda Inc., Toronto, Canada

Filed Apr. 29, 1983, Ser. No. 490,021
Claims priority, application Canada, Jun. 18, 1982, 405473
Int. Cl.³ C22B *15/00*
U.S. Cl. 75—72 **8 Claims**



1. A process for continuous converting of non-ferrous mattes comprising the steps of:

(a) feeding a liquid matte at least intermittently throughout the process into a horizontal generally elongated furnace which is stationary during normal operation;

(b) continuously blowing an oxidizing gas into the melt through tuyeres submerged below the melt surface at a rate in balance with the rate of feed of liquid matte and the desired degree of oxidation;

(c) introducing flux into the furnace at a rate in balance with the feed of matte and said oxidizing gas; and

(d) removing slag from the top of the melt and a refined product from beneath the melt while said oxidizing gas is blown through the melt.

4,504,310

PROCESS FOR THE PRODUCTION OF HIGH PURITY METALS OR ALLOYS

Laurent L. Boulier, Gagny, France, assignor to C. Delachaux, Gennevilliers, France

Filed Aug. 5, 1983, Ser. No. 520,802
Claims priority, application France, Aug. 20, 1982, 82 14386
Int. Cl.³ C21B *15/02*
U.S. Cl. 75—27 **16 Claims**

1. A process for the production of a high purity metal or metallic alloy, comprising

(a) forming a base metal or metallic alloy by an aluminothermic reaction between at least one metal oxide and comminuted aluminum, the reaction being kept out of equilibrium by a deficiency of aluminum relative to stoichiometic quantity, whereby said base metal or metallic alloy contains reducible non-metallic inclusions comprising principally inclusions of the oxide of the base metal, with a minor amount of inclusions of alumina;

(b) milling the base metal or metallic alloy thus obtained;

(c) agglomerating the milled metal or metallic alloy with an agglomerating agent and a reducing agent, so as to form compacted agglomerates; and

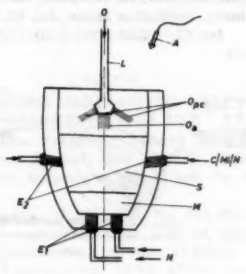
(d) subjecting the compacted agglomerates to a reducing treatment under regulated conditions of reduced pressure and elevated temperature at which the reducing agent acts on the non-metallic inclusions but substantial sublimation of the metal or metallic alloy is avoided.

4,504,311

PROCESS AND APPARATUS FOR A DIRECT FORMATION OF MOLTEN IRON

Antoine Weiner, Luxembourg, Luxembourg, assignor to Arbed S.A., Luxembourg

Continuation of Ser. No. 446,054, Dec. 1, 1982, abandoned. This application Jul. 26, 1984, Ser. No. 634,755
Claims priority, application Luxembourg, Sep. 12, 1981, 83826
Int. Cl.³ C21C *7/00*
U.S. Cl. 75—51 **15 Claims**



1. In a continuous process for the direct production of molten iron from iron ore in a metallurgical vessel having an existing iron melt, said melt having a carbon content of over one percent, said melt being covered with a layer of slag, and wherein heat is produced and the slag is oxidized and increased in slag foam formation, the steps of:

decarbonizing by oxygen top blowing;

continuously measuring the thickness of the foam layer;

delivering an inert gas into the iron melt to counteract foam buildup when the slag layer reaches or exceeds an empirically determined limiting value;

introducing into the slag foam pulverized iron ore and carbon in a carrier gas, said iron ore being introduced into the slag foam through at least one gas passing charging element; and

controlling the blowing of oxygen and inert gas to maintain the slag level at a predetermined height.

4,504,312

WEAR-RESISTANT SINTERED FERROUS ALLOY AND METHOD OF PRODUCING SAME

Takaaki Ouku, Yokosuka; Yoshihiro Maki, Miura, and Yasuzi Hokazono, Yokohama, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Jun. 22, 1983, Ser. No. 506,767

Claims priority, application Japan, Jul. 6, 1982, 57-116275

Int. Cl.³ B22F *3/00*

U.S. Cl. 75—244 **5 Claims**

1. A wear-resistant sintered ferrous alloy consisting essentially of 2.0 to 8.0% of Cr, 0.1 to 1.0% of B, 1.0 to 2.5% of Si, 0.3 to 1.2% of Mn, 1.2 to 3.8% of C, by weight, and the balance of Fe.

4,504,313

POLYAMINES AND POLYOLS CONTAINING A POLYSILOXANE INTERNAL MOLD RELEASE AGENT FOR USE IN PREPARING POLYURETHANE AND POLYUREA RESINS

John R. Robertson, Glenn Mills, Pa., assignor to ICI Americas Inc., Wilmington, Del.

Continuation-in-part of Ser. No. 484,538, Apr. 13, 1983, abandoned. This application Feb. 6, 1984, Ser. No. 577,296

Int. Cl.³ B28B *7/36*

U.S. Cl. 106—38.2 **27 Claims**

1. A liquid blend for use in preparing reaction injected molded polyurethane, polyurea and polyureaurethane resins having improved mold release properties which comprises at least one organic polyol and/or polyamine having 2 to 6 isocyanate reactive groups and a molecular weight of 1,000–10,000 having dispersed therein from 0.5–8.0 percent by weight of a polysiloxane mold release agent which consists essentially of 0.5–20 mol percent of $R_aR'_bSiO_{[4-(a+b)]/2}$ units and from 80–99.5 mol percent of $R''_cSiO_{(4-c)/2}$ units where R is an isocyanate reactive organic radical, a has an average value of from 1–3, R′ and R″ are both non-isocyanate reactive organic radicals, b has an average value of 0–2, a+b is from 1–3, and c has an average value of from 1–3, wherein

the ratio of the total molecular weight of said polysiloxane mold release agent to the total number of isocyanate reactive functional groups in said polysiloxane mold release agent ranges from 100–3500,

the combined formula weights of all isocyanate reactive organic radicals, R do not exceed 40% of the total molecular weight of said polysiloxane mold release agent,

the combined formula weights of all non-isocyanate reactive radicals, R′+R″ together do not exceed 40% of the total molecular weight of said polysiloxane mold release additive.

the combined formula weights of all the organic radicals R+R′+R″ in the molecule together do not exceed 60% of the total molecular weight of the molecule,

said polysiloxane mold release agent contains an average of at least two isocyanate reactive functional groups per molecule,

at least two of the isocyanate reactive functional groups in each molecule are located on separate organic radicals, R, attached independently to different silicon atoms in said polysiloxane,

said isocyanate reactive functional groups (R) are selected from the group consisting of alcohols, phenols, thiols, primary or seecondary aromatic amines, which contain no oxygen, and not more than one nitrogen atom attached directly to, in conjugation with, or incorporated within, the aromatic ring nucleous, and secondary aliphatic amines wherein at least one of the alkyl carbon atoms, bonded directly to the nitrogen atom, is not a primary carbon atoms,

the molecular weight of said polysiloxane mold release agent ranges from 1000 to 30,000, and

said polysiloxane mold release agent being substantially insoluble in liquid organic isocyanates.

4,504,314

ALKALI METAL SILICATE BINDER COMPOSITIONS

Sidney A. Barker; Neil Baggett, both of Birmingham; John Stevenson, Sutton Coldfield, and David R. deCourcy, Birmingham, all of England, assignors to Foseco International Limited, Birmingham, England

Filed Nov. 23, 1983, Ser. No. 554,711

Claims priority, application United Kingdom, Dec. 11, 1982, 8235375

Int. Cl.³ B28B *7/34*

U.S. Cl. 106—38.35 **8 Claims**

1. A binder composition in aqueous solution obtained by mixing an alkali metal silicate and glycosylated polyhydric alcohols produced by acid catalysed condensation of a carbohydrate having a reducing group and an alcohol having two or more hydroxyl groups, said solution being characterized by its stability on storage.

8. A method of making an article of bonded particulate material which comprises forming to the desired shape a mixture comprising particulate material and a binder according to claim 1, and causing or allowing the mixture to harden.

4,504,315

LIQUID ACCELERATOR FOR THE SETTING OF CONCRETE MIXTURES

Kurt Allemann, Schmitten, Switzerland; Klaus Deneke, Troisdorf, Fed. Rep. of Germany; Hansjürgen Hass, Troisdorf, Fed. Rep. of Germany, and Günter Vogel, Hennef, Fed. Rep. of Germany, assignors to Dynamit Nobel AG, Troisdorf, Fed. Rep. of Germany

Filed Feb. 22, 1984, Ser. No. 582,625

Claims priority, application Fed. Rep. of Germany, Feb. 24, 1983, 3306448

Int. Cl.³ C04B *7/35*

U.S. Cl. 106—89 **7 Claims**

1. A liquid accelerator for setting concrete mixtures comprising an aqueous solution of potassium aluminate, potassium hydroxide and potassium carbonate wherein

(a) the ratio of moles of K_2O not bound to potassium carbonate to moles of Al_2O_3 is between about 1.1 and 1.4;

(b) the content of water as a solvent is such that the ratio of moles of water to moles of Al_2O_3 is between about 9.5 and 20; and

(c) the potassium carbonate content is between about 0.1 and 3.4 mole-%.

4,504,316

ALUMINUM SALTS OF AROMATIC SULFONIC ACIDS FORMALDEHYDE CONDENSATES

Stanley A. Lipowski, Livingston, N.J., assignor to Diamond Shamrock Chemicals Company, Dallas, Tex.

Division of Ser. No. 345,238, Feb. 3, 1982, Pat. No. 4,443,382. This application Sep. 13, 1982, Ser. No. 417,515

Int. Cl.³ C04B *7/35*

U.S. Cl. 106—90 **10 Claims**

1. In a process for producing a hardened cement mix having enhanced compressive strength comprising adding an amount effective to improve compressive strength of the hardened cement mix of an aluminum salt of an aromatic sulfonic acid formaldehyde condensate wherein the aluminum salt is a reaction product of an aromatic sulfonic acid formaldehyde condensate with freshly prepared aluminum hydroxide to a cement mix containing 100 parts by weight of cement, from about 200 to about 400 parts by weight of sand and from about 40 to about 60 parts by weight of water.

4,504,317

ENCAPSULATION OF BORIC ACID SLURRIES

Eugene E. Smeltzer, Export; Yoshio Ichikawa, Pittsburgh, and George N. Schneider, Jr., North Huntingdon, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 7, 1983, Ser. No. 472,526
Int. Cl.³ C04B 7/35
U.S. Cl. 106—90 11 Claims

1. A process for encapsulating in cement a slurry of about 30 to about 70% boric acid in water, comprising adding to said slurry:

(a) about 3.5 to about 4.5% as a dispersing agent, based on the weight of said cement;

(b) about 0.02 to about 0.03 ml of a retarder per gram of a cement;

(c) up to about 0.4% of a hardener, based on the weight of said cement; and

(d) sufficient cement for a weight ratio of water to cement of about 0.04 to about 0.6.

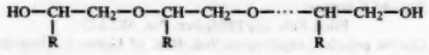
4,504,318

PROCESS FOR PRODUCING PLASTIC CONCRETE

Hideaki Matsuda, and Takasi Sabeki, both of Marugame, Japan, assignors to Okura Kogyo Kabushiki Kaisha, Japan

Filed Oct. 31, 1983, Ser. No. 547,393
Claims priority, application Japan, Jan. 20, 1983, 58-6685
Int. Cl.³ C04B 7/35
U.S. Cl. 106—90 9 Claims

1. A process of producing a plastic concrete which comprises forming a water-in-oil inverted emulsion of vinyl monomers in the presence of a polyalkylene glycol derivative having terminal carboxyl groups, which is an addition product of a polyalkylene glycol represented by the following general formula and a dibasic acid anhydride



wherein R represents an alkyl group having one or more carbon atoms

and a cement slurry and polymerizing the inverted emulsion in the presence of a polymerization catalyst while hardening the cement.

4,504,319

METHOD AND APPARATUS FOR BURNING CEMENT CLINKER

Albrecht Wolter, Cologne, and Horst Herchenbach, Hennef, both of Fed. Rep. of Germany, assignors to Klöckner-Humboldt-Deutz AG, Fed. Rep. of Germany

Filed Nov. 21, 1983, Ser. No. 554,041
Claims priority, application Fed. Rep. of Germany, Dec. 4, 1982, 3244943
Int. Cl.³ C04B 7/44
U.S. Cl. 106—100 25 Claims

1. A method for burning cement clinker from two differing base materials, one base material having a relatively high proportion of components forming melt phases at a predetermined temperature and the other of said base materials having a relatively slight proportion of components forming melt phases at said predetermined temperature, which comprises:

separately thermally pretreating each of said base materials, at least partially melting said base material having a relatively high proportion of components forming melt phases,

passing the at least partially molten material together with solid particles of the thermally pretreated base material having a relatively slight proportion of components forming melt phases into a clinker reactor, and

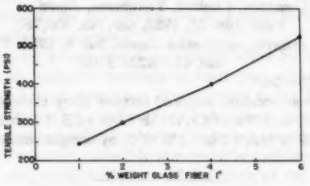
forming cement clinker from the resulting mixture in said reactor.

4,504,320

LIGHT-WEIGHT CEMENTITIOUS PRODUCT

Janine M. Rizer, Mechanicville, and Carl Gotzmer, Accokeek, both of Md., assignors to Research One Limited Partnership, Towson, Md.

Filed Sep. 26, 1983, Ser. No. 535,479
Int. Cl.³ C04B 7/02
U.S. Cl. 106—98 6 Claims



1. A light-weight cementitious product exhibiting a density of less than 85 pounds per cubic foot, a tensile strength, after curing, of at least about 600 psi, and a compressive strength of at least 10 times the tensile strength, comprising a cement matrix, and aggregate consisting of substantially equal parts of fly ash cenospheres and silica fume and reinforced with chopped glass fibers, said chopped glass fibers not exceeding ½" in length.

4,504,321

PROCESS FOR TREATING AND STABILIZING CHROMIUM ORE WASTE

Mitchell A. Kapland, Annapolis, Md., and Melville W. Robinson, Jr., Beaver, Pa., assignors to Trident Engineering Associates, Inc., Annapolis, Md.

Filed Feb. 17, 1984, Ser. No. 581,419
Int. Cl.³ C04B 23/00
U.S. Cl. 106—117 9 Claims

1. A method for treating and stabilizing chromium ore wastes comprising the combination of steps of:

(i) admixing said chromium ore waste with mud or sludge dredged from mud- or sludge-containing water wherein said mixture has a solids content from 20% to 80%, said mixture containing chromium ore waste measured on a dry solids basis ranging from 10% to 125% of the dry solids content of said mud or sludge;

(ii) intimately admixing to the resulting mixture of step (i) ground granulated blast furnace slag in an amount ranging from 5 to 30 weight percent based on the total solids content of said mixture resulting from step (i); and

(iii) maintaining the mixture resulting from step (ii) in a quiescent state whereby said mixture resulting from step (ii) sets so as to yield a solid mass having low permeability and high load bearing characteristics.

4,504,322

RE-WORK METHOD FOR REMOVING EXTRANEOUS METAL FROM CERMIC SUBSTRATES

Avinash S. Adwalpalker, Stormville; Ananda H. Kumar, Wappingers Falls, and Renee L. Weisman, Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 20, 1982, Ser. No. 435,572
Int. Cl.³ B08B 7/00
U.S. Cl. 134—1 11 Claims

1. A re-work process for selectively removing extraneous plated metal layer areas of a metal selected from the group consisting of Ni, Au, Cu and alloys thereof. from the surface of a defective ceramic substrate containing refractroy metal surface areas of a metal selected from the group consisting of W, Ta, Mo, and mixtures thereof, capable of making electrical

contact with semiconductor devices mounted on the top surface of the substrate comprising,

heating the substrate at a temperature for a time sufficient to strengthen the interface bond between the plated metal layer and the refractory metal areas while reducing the interface bond between the extraneous plated metal layer areas overlying the ceramic, and the ceramic substrate,

cooling the substrate

immersing the resultant heated-treated substrate in a liquid,

applying localized ultrasonic energy in close proximity to the extraneous plated metal areas to be removed until the metal areas are separated from the substrate but leaving the plated metal areas overlying said refractory metal areas.

4,504,323

METHOD FOR ANNEALING SEMICONDUCTORS WITH A PLANAR SOURCE COMPOSED OF FLASH DISCHARGE LAMPS

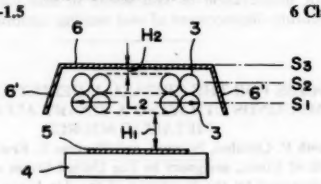
Tetsuji Arai, Kobe, and Mitsuru Ikeuchi, Imabari, both of Japan, assignors to Ushio Denki Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 301,434, Sep. 11, 1981, abandoned. This application Jul. 14, 1983, Ser. No. 513,614

Claims priority, application Japan, Sep. 12, 1980, 55-126068

Int. Cl.³ H01L *21/265*

U.S. Cl. 148—1.5 **6 Claims**



1. Method of annealing a semiconductor comprising the steps of:

disposing a plurality of flash discharge lamps in each of two or more planes parallel and adjacent to a semiconductor wafer;

disposing a plane mirror in a plane parallel and adjacent to the two or more planes on the opposite side from the semiconductor wafer; and

lighting at least one of the flash discharge lamps disposed in a specified one of the planes after lighting at least one of the flash discharge lamps in the other plane, thereby annealing the semiconductor wafer.

4,504,324

SURFACE TREATMENT OF ALUMINUM MATERIALS

Nobuo Furuno, Hyogo, Japan, assignor to Nippon Paint Co., Ltd., Osaka, Japan

Filed Nov. 7, 1983, Ser. No. 549,545

Int. Cl.³ C23F *7/08, 7/26*

U.S. Cl. 148—6.15 R **4 Claims**

1. A method for the treatment of aluminum material comprising treating the aluminum material in regular succession in treating baths connected in a series of multi-stage alkaline baths and multi-stage acid baths, said alkaline baths having an alkali concentration gradient continually decreasing from 3N to a lower value, the alkali concentration in the last stage bath being controlled to a defined level of 1×10^{-6}–5×10^{-1}N, and the acid baths having an acid concentration gradient continually decreasing from 3N to a lower value, the last stage bath liquid being deionized water having a specific electrical conductance of less than 10 μS/cm.

4,504,325

METHOD FOR SEALING AN ALUMINUM OXIDE FILM

Yukimori Moji, Seattle, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Mar. 19, 1982, Ser. No. 359,853

Int. Cl.³ C23F *7/06*

U.S. Cl. 148—6.2 **19 Claims**

1. A method for sealing a porous aluminum oxide film formed on an aluminum substrate to improve corrosion resistance and organic coating adhesion comprising:

contacting said film with a dilute aqueous sealing solution comprising

an oxidizing composition comprising chromic acid, said oxidizing composition being present in said solution in an amount ranging from 20 to 200 ppm, all proportions herein being based on said total solution and being by weight, and

a pH altering composition that maintains the pH of said solution in the range of from 3.2 to 4.0 selected from the group consisting of a buffering composition, a base or mixtures thereof, said film being in contact with said solution for from 5 to 60 minutes, said solution being maintained within a temperature range of from 160° F. to the boiling point of said solution.

17. A method for sealing a porous aluminum oxide film formed on an aluminum substrate to improve corrosion resistance and organic coating adhesion comprising:

contacting said film with a dilute aqueous sealing solution comprising

an oxidizing composition selected from the group consisting of molybdic acid, ammonium or alkali metal chromate or dichromate, ammonium or alkali metal vanadate, ammonium or alkali metal molybdate, ammonium or alkali metal tungstate, or mixtures thereof, and

a pH altering composition that maintains the pH of said solution in the range of from 3.2 to 4.0, said film being in contact with said solution for from 5 to 60 minutes, said solution being maintained within a temperature range of from 160° F. to the boiling point of said solution.

4,504,326

METHOD FOR THE PRODUCTION OF COLD ROLLED STEEL SHEET HAVING SUPER DEEP DRAWABILITY

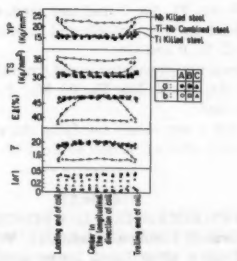
Yoshikuni Tokunaga, and Masato Yamada, both of Tokai, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Oct. 6, 1983, Ser. No. 539,678

Claims priority, application Japan, Oct. 8, 1982, 57-176340; Apr. 14, 1983, 58-64604; Apr. 23, 1983, 58-71939

Int. Cl.³ C21D *8/04*

U.S. Cl. 148—12 C **13 Claims**



1. A method for producing a deep drawable steel sheet, which comprises:

providing a steel containing, in weight %, less than 0.007% C, less than 0.8% Si, less than 1.0% Mn, less than 0.1% P, 0.01–0.1% Al, less than 80 ppm N, Ti in an amount which satisfies the relationship $48/14(N\ \%-0.002\%)<Ti\ \%<(48/12C\ \%+48/14N\ \%)$, Nb in an amount of at least

0.003% but less than 0.025% and which satisfies the relationship Nb %>2.33C %, the total amount of Nb and Ti being such that Nb+Ti<0.04%, and optionally B in solid solution, the remainder being Fe and unavoidable impurities;

hot rolling said steel while causing all of said N in said steel to become fixed as TiN;

cold rolling said hot rolled steel; and

subjecting said cold rolled steel to a continuous anneal at a temperature of more than 700° C. but less than the Ac_3 transformation point.

4,504,327

CORROSION-RESISTANT AND WEAR-RESISTANT MAGNETIC AMORPHOUS ALLOY AND A METHOD FOR PREPARING THE SAME

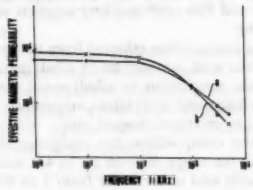
Koichiro Inomata, Yokohama; Hiroshi Tateishi, Zushi; Emiko Higashinakagawa, Kawasaki, and Kanemitsu Sato, Yokohama, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Aug. 1, 1983, Ser. No. 518,850

Claims priority, application Japan, Sep. 6, 1982, 57-153836; Sep. 7, 1982, 57-154559

Int. Cl.³ C22C *38/10, 38/12, 1/00*

U.S. Cl. 148—31.55 **10 Claims**



1. A corrosion-resistant and wear-resistant magnetic amorphous alloy characterized by having, on the surface thereof, an oxide layer including a crystalline oxide, produced by oxidizing said alloy, wherein said magnetic amorphous alloy is represented by the following formula:

$$(Co_{1-x-y}Fe_xM_y)_zG_{100-z} \quad \text{or}$$

$$(Co_{1-x-y}Fe_xM_y)_uT_{100-u} \quad \text{in terms of atomic \%}$$

wherein

M is at least one element selected from the group consisting of Ti, V, Cr, Mn, Ni, Cu, Zr, Nb, Mo, Ru, Rh, Pd, Ag, Hf, Ta, W, Re, Pt, Au, Y and rare earth elements;

G is at least one element selected from the group consisting of B, C, Si, P and Ge;

T is at least one element selected from the group consisting of Ti, Zr, Hf, V, Nb, Ta, W, Mo, Y and rare earth elements; and

x, y, z and u are values satisfying the relations of $0 \leqq x \leqq 0.2$, $0 \leqq y \leqq 0.2$, $65 \leqq z \leqq 90$ and $85 \leqq u \leqq 95$, respectively.

4,504,328

LIQUID PHASE EPITAXIAL GROWTH TECHNIQUE

Ryoichi Hirano; Hirofumi Namizaki; Wataru Susaki, and Toshio Tanaka, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 20, 1983, Ser. No. 534,113

Claims priority, application Japan, Oct. 12, 1982, 57-180401

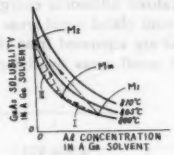
Int. Cl.³ H01L *21/208*

U.S. Cl. 148—171 **8 Claims**

1. A method of sliding scheme liquid phase epitaxial growth for forming a heterostructure junction using a melting solution whose solubility of a solute in a solvent thereof is temperature-dependent and varies in a non-linear manner with addition of an additive element, said method comprising the steps of:

forming a first layer in an expitaxial growth manner with a first melting solution including a first composition of said solute and said additive element in the solvent; and

forming a second layer in an epitaxial growth manner after said first melting solution is replaced by at least one third melting solution and then by a second melting solution



including a second composition of said solute and said additive element in said solvent, each said third melting solution including a third composition of said solute and said additive element in said solvent between said first and second compositions and becoming saturated at the same temperature in respect of said solute as said first and second melting solutions thereby suppressing supersaturation or unsaturation of said solute in said melting solution during displacement of said melting solutions.

4,504,329

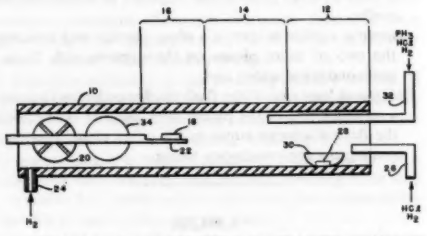
PROCESS FOR THE EPITAXIAL DEPOSITION OF III-V COMPOUNDS UTILIZING A BINARY ALLOY AS THE METALLIC SOURCE

Kenneth P. Quinlan, Newton, and Thomas E. Erstfeld, Bedford, both of Mass., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Oct. 6, 1983, Ser. No. 539,603

Int. Cl.³ H01L *21/205, 21/365*

U.S. Cl. 148—175 **2 Claims**



1. A method for preparing and depositing an epitaxial crystalline film comprised of a III–V compound onto the surface of a suitable substrate crystallographically compatable with said film, said method comprising the steps of:

(A) positioning a substrate suitable for epitaxial growth of III–V compounds on the surface thereof in a first zone located at one end of a reaction chamber while maintaining said first zone at a predetermined temperature of about 700° C.;

(B) positioning a binary metal alloy source material composed of about 12.2 mole percent gallium and about 87.8 mole percent indium in a second zone located at the other end of said chamber while maintaining said second zone at a predetermined temperature of about 800° C.;

(C) introducing a gaseous mixture composed of (a) a hydrogen chloride gas and (b) an inert carrier gas into said

heated second zone and passing said hydrogen chloride gas mixture over said binary metal alloy to produce a first gaseous reactant mixture formed by the reaction between said hydrogen chloride and said binary metal alloy source material;

(D) introducing said first gaseous reactant mixture into a third zone of said chamber, said third zone being maintained at a predetermined temperature of about 850° C. and positioned intermediate said first and second zones;

(E) introducing a second gaseous reactant into said third zone simultaneously with the entry of said first gaseous reactant mixture into said third zone, said second gaseous reactant comprising a mixture of (a) a hydride selected from the group consisting of phosphine, arsine, and stibine and (b) an inert carrier gas to form an admixture between said first gaseous reactant mixture and said second gaseous reactant;

(F) introducing said admixture into said heated first zone and contacting said substrate to affect the deposition of a $Ga_{0.47}In_{0.53}A_s$ ternary epitaxial crystalline film thereon.

4,504,330

OPTIMUM REDUCED PRESSURE EPITAXIAL GROWTH PROCESS TO PREVENT AUTODOPING

Arun K. Gaind, LaGrangeville; Subhash B. Kulkarni, Peekskill, and Michael R. Poponiak, Newburgh, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 19, 1983, Ser. No. 543,555

Int. Cl.³ H01L *21/205, 21/74, 21/76*

U.S. Cl. 148—175 **3 Claims**

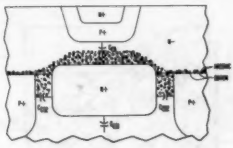
1. A reduced pressure epitaxial deposition process comprising:

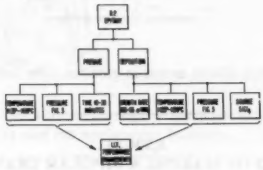
providing a silicon substrate having an arsenic subcollector area and a boron isolation area bearing a predetermined ratio relative to each other,

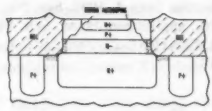
baking said substrate at a temperature in the range from about 1125° C. to about 1150° C. for a time in the range from about 10 to about 20 minutes at a pressure below one atmosphere and within the hatched area shown in the plot of FIG. 3 as a function of said ratio, and

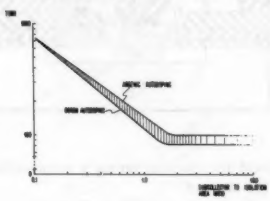
depositing epitaxial silicon using a silicon tetrachloride process at a temperature in said range,

using a growth rate in the range from about 0.05 to about 0.5 micrometers per minute, and









a pressure below one atmosphere and within the hatched area shown in said plot of FIG. 3 as a function of said ratio.

4,504,331

SILICON DOPANT SOURCE IN INTERMETALLIC SEMICONDUCTOR GROWTH OPERATIONS

Thomas F. Kuech, Ossining, and Bernard S. Meyerson, Yorktown Heights, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

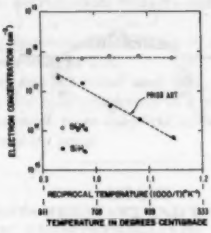
Filed Dec. 8, 1983, Ser. No. 559,583

Int. Cl.³ H01L *21/205, 21/322*

U.S. Cl. 148—175 **7 Claims**

1. In the metal organic chemical vapor deposition growth of an intermetallic semiconductor crystal wherein silicon is introduced as a dopant during said growth the improvement com-

prising providing said silicon dopant from a source of a hydride based compound of silicon involving a molecule where



there are joined silicon atoms in gaseous form over said growing crystal.

4,504,332

METHOD OF MAKING A BIPOLAR TRANSISTOR

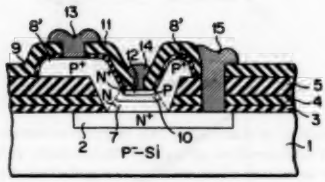
Kazuyoshi Shinada, Yokohama, Japan, assignor to VLSI Technology Research Association, Japan

Continuation of Ser. No. 72,835, Sep. 6, 1979, abandoned. This application May 3, 1982, Ser. No. 374,232

Claims priority, application Japan, Sep. 14, 1978, 53/113348

Int. Cl.³ H01L *21/225, 21/265, 21/28*

U.S. Cl. 148—187 **5 Claims**



1. A method for manufacturing a semiconductor device, comprising the steps of:

(i) selectively forming in the surface of a semiconductor substrate an embedded layer of a conductivity type opposite to that of said substrate;

(ii) covering said substrate having said embedded layer formed therein with an insulating layer containing an impurity at least in the superficial region thereof;

(iii) removing by etching said insulating layer on said embedded layer to provide an opening portion through which at least part of said embedded layer is exposed;

(iv) simultaneously forming by epitaxial growth a single-crystal semiconductor layer of the same conductivity type as that of said embedded layer on said embedded layer at said opening portion and a polycrystalline semiconductor layer on said insulating film;

(v) diffusing by heating the impurity in said insulating layer into said polycrystalline semiconductor layer to provide said polycrystalline semiconductor layer with a conductivity type opposite to that of said single-crystal semiconductor layer;

(vi) heat-treating in an O_2-containing atmosphere the surface of said polycrystalline semiconductor layer and the surface of said single-crystal semiconductor layer to form on said surfaces a thermal oxide layer having a portion on said single-crystal semiconductor layer thinner than the portion on said polycrystalline semiconductor layer;

(vii) etching said thermal oxide layer until the portion of said thermal oxide layer on said single-crystal semiconductor layer is etched off, leaving the thermal oxide layer on said polycrystalline semiconductor layer; and

(viii) successively forming an internal base region and an emitter region in said single-crystal semiconductor layer by self-alignment using the remaining thermal oxide layer as a mask.

4,504,333

METHOD OF MAKING FIELD OXIDE REGIONS

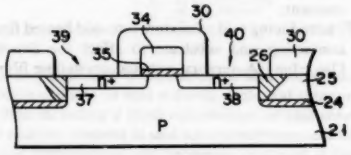
Kei Kurosawa, Tokyo, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Jun. 4, 1982, Ser. No. 384,946

Claims priority, application Japan, Jun. 10, 1981, 56-88256

Int. Cl.³ H01L *21/22*

U.S. Cl. 148—187 **3 Claims**



1. A method of manufacturing a semiconductor device wherein a contact hole to a doped region is formed comprising the steps of:

forming a recess in a portion of a semiconductor substrate corresponding to a field region;

forming a first insulating film in said recess such that a groove is defined at the edge of said first insulating film;

forming a second insulating film over the entire surface to fill said groove;

exposing portions of said substrate corresponding to element formation regions while leaving said first and second insulating films in said recess;

forming said element-formation region with an impurity-doped surface region adjacent to said field region;

forming over the entire surface a third insulating film of a different substance having a higher etching rate than said second insulating film; and

forming through said third insulating film a contact hole for electrically connecting a lead to said impurity-doped region such that said contact hole partly overlaps said second insulating film in said recess.

4,504,334

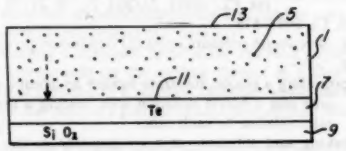
GETTERING METHOD FOR MERCURY CADMIUM TELLURIDE

Herbert F. Schaake, Denton; John H. Tregilgas, Richardson, and Jeffrey D. Beck, Plano, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 23, 1983, Ser. No. 564,872

Int. Cl.³ H01L *21/324, 21/385*

U.S. Cl. 148—191 **6 Claims**



1. A method of removing impurities from a HgCdTe member comprising the steps of:

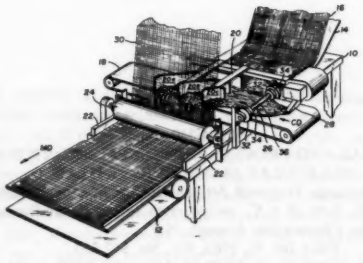
(a) providing a HgCdTe member having impurities substantially uniformly dispersed therethrough;

(b) forming a tellurium layer on a portion of the exposed surface of said member;
(c) annealing the member resulting from step (b) at a temperature less than about 450 degrees C. in a saturated mercury atmosphere for a period of from about one day to about four weeks; and
(d) removing said tellurium layer and impurities in an adjacent layer thereto.

4,504,335
METHOD FOR MAKING REINFORCED CEMENT BOARD

Richard E. Galer, Hanover Park, Ill., assignor to United States Gypsum Company, Chicago, Ill.

Filed Jul. 20, 1983, Ser. No. 515,399
Int. Cl.³ B32B *31/08, 31/18, 13/14*
U.S. Cl. 156—42 **4 Claims**



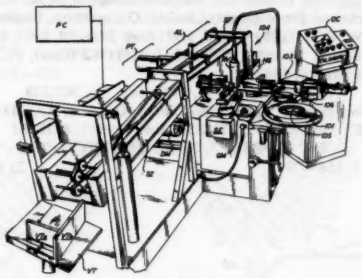
1. A method for the continuous production of an indefinitely long cementitious panel having a cross section of substantially uniform thickness, said method employing but one cementitious composition and comprising: towing an indefinitely long carrier sheet over a supporting surface and under a continuous stream of mortar, distributing the mortar across the breadth of the carrier sheet, towing the mortar-laden carrier sheet through a slit defined by said supporting surface and a cylindrical mortar screeding roller mounted above the supporting surface so that its axis is transversely parallel to the supporting surface, dragging a dry, indefinitely long network of reinforcing fibers against the roller and through the slit, rotating the roller counter to the direction of travel of the carrier sheet, whereby the roller presses the network into the surface of the mortar and wipes mortar adhering to the roller into the interstices of the network, and towing the resulting broad, flat ribbon of mortar toward a cutter.

4,504,336
TAB APPLYING METHOD AND APPARATUS

Anselm Talalay, 2867 Ludlow Rd., Cleveland, Ohio 44120

Filed Dec. 27, 1983, Ser. No. 565,711
Int. Cl.³ B32B *1/00*
U.S. Cl. 156—64 **36 Claims**

1. The method of affixing tabs to edges of pages at different locations along the edges which comprises the steps of: transporting individual tabs from a series of sequences of tabs in a predetermined sequence to a predetermined tab application location, successive tabs in each sequence differing from each other; transporting a succession of pages to and beyond said tab application location; sensing marks along an edge of various of said pages; stopping each page from which a mark is sensed so that said mark is located at said tab application location; and applying the tab which has been transported to said

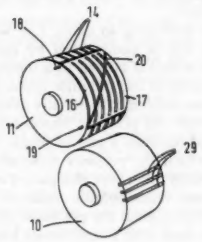


tab application location to an edge of the page stopped with its mark located at said tab application location.

4,504,337
TIRE BUILDING MACHINERY

John F. Askam, Sutton Coldfield, and William H. Coton, Birmingham, both of England, assignors to Dunlop Limited, London, England

Filed Apr. 30, 1984, Ser. No. 605,411
Claims priority, application United Kingdom, May 11, 1983, 8312994
Int. Cl.³ G01B *5/02, 7/04;* **B29H** *17/16*
U.S. Cl. 156—64 **10 Claims**



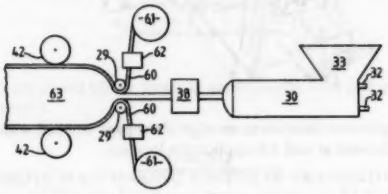
1. A method for the manufacture of an annular tire component from strip material comprising feeding the strip material to a measuring drum of predetermined circumference and rotating said measuring drum simultaneously with the feeding of the strip to transfer the material to a building former, the material being arranged throughout the feeding and transfer of the strip material to lap a portion only of the measuring drum, and severing a measured length of the strip on the measuring drum, the length of strip being transferred to the building former by rotation of the measuring drum through substantially a whole revolution.

3. Apparatus for the manufacture of an annular tire component from strip material comprising a measuring drum of predetermined circumference arranged to transfer strip material to a component building former, means for supplying strip material to the measuring drum simultaneously with the transfer of material from the drum to the former whereby the material laps a portion only of the measuring drum during the processes of feeding and transfer, and cutting means for severing a length of the strip on the measuring drum, said predetermined circumference of the measuring drum being such that the major portion of the length of the strip is transferred to the building former by rotation of the measuring drum through substantially a whole revolution.

4,504,338
METHODS OF PRODUCING COMPOSITE FOAMED THERMOPLASTIC RESIN ARTICLES

Peter J. Ives, Leominster, England, assignor to H. R. Smith (Technical Development) Limited, Oxfordshire, England

PCT No. PCT/GB81/00165, § 371 Date Mar. 30, 1982, § 102(e) Date Mar. 30, 1982, PCT Pub. No. WO82/00649, PCT Pub. Date Mar. 4, 1982
PCT Filed Aug. 18, 1981, Ser. No. 367,228
Claims priority, application United Kingdom, Aug. 18, 1980, 8026857; May 6, 1981, 8113850; Jun. 1, 1981, 8116662
Int. Cl.[3] B32B 5/20, 31/20; B29D 27/00
U.S. Cl. 156—79 21 Claims



1. A method of producing thermoplastic articles consisting essentially of the steps of mixing an aromatic thermoplastic polymer material in granular or powder form with sufficient amount of a solvent comprising a non-aqueous volatile organic solvent or partial solvent of said polymer to form a gel, subjecting the gel so formed to compression to produce a pre-form of substantially greater density than said gel and free of large irregular holes and thereafter heating the pre-form so produced at a temperature at which it foams to form the foamed thermoplastic article.

18. A method according to claim 1 in which the polymer material/solvent mix is compressed by passage through an extruder and die which is cooled to a temperature below the foaming temperature of the polymer material/solvent mix, in which the pre-form so formed is initially dried at a temperature below that at which the polymer material/solvent mix foams and is then passed between a pair of pinch rollers heated to a temperature at which the polymer material/solvent mix will foam, to which pinch rollers are also passed one or more layers of fibre reinforced thermoplastic material, the surfaces of which layers which contact the pre-form being coated with a layer of adhesive such that a continuous length of composite foamed thermoplastic-reinforced thermoplastic material is produced.

4,504,339
METHOD FOR PRODUCING MULTILAYERED GLASS-CERAMIC STRUCTURE WITH COPPER-BASED CONDUCTORS THEREIN

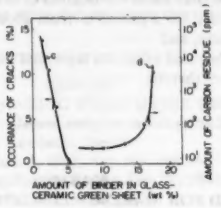
Nobuo Kamehara, Isehara; Kazuaki Kurihara, Kawasaki, and Koichi Niwa, Tama, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Jun. 9, 1983, Ser. No. 502,598
Claims priority, application Japan, Jun. 16, 1982, 57-101990
Int. Cl.[3] C03B 29/00; C04B 33/34, 37/00
U.S. Cl. 156—89 14 Claims

1. A method for producing a multilayered glass-ceramic structure with copper-based conductors therein, comprising the steps of:

(a) forming a multilayered structure having patterns of copper-based paste and ceramic layers laminated alternately, at least the ceramic layers located between the patterns of copper-based paste being glass-ceramic green sheets containing a thermally depolymerizable resin as a binder;

(b) firing the multilayered structure in an inert atmosphere containing water vapor, the partial pressure of the water vapor being from 0.005 to 0.3 atmosphere, said firing at a temperature which is sufficient to depolymerize and eliminate the binder contained in the glass-ceramic green sheets, but which is not sufficient to cause a substantial change in the state of the glass components and copper; and

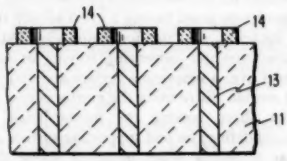


(c) raising, in an inert atmosphere without water vapor, the firing temperature to a temperature at which particles of the glass components coalesce, but at which the metallic state of the copper is not affected.

4,504,340
MATERIAL AND PROCESS SET FOR FABRICATION OF MOLECULAR MATRIX PRINT HEAD

Rao R. Tummala, Hopewell Jct., and Raj N. Master, Wappingers Falls, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jul. 26, 1983, Ser. No. 517,533
Int. Cl.[3] C03B 29/00; C04B 33/34, 37/00; B32B 31/00
U.S. Cl. 156—89 9 Claims



1. A method of making a matrix printing head comprising a plurality of discrete electrodes, the ends of which are coplanar with and insulated from a common ground plane, comprising the steps of:

(a) perforating a plurality of unfired ceramic sheets with a predetermined pattern of holes;

(b) filling the holes in each of said sheets with an electroding paste;

(c) laminating said sheets with the filled holes therein in alignment;

(d) forming a plurality of unfired ceramic tori raised from the surface of the outermost one of said sheets by embossing, said tori having upper surfaces raised above said electroding paste and being arranged coaxially with each of said filled openings;

(e) applying a layer of a conducting material to the thus embossed surface of said outermost sheet so as to surround and fill said tori, said layer having a thickness substantially equal to that of the tori;

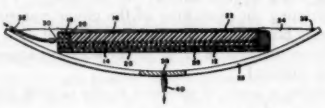
(f) sintering the assembly; and

(g) finishing the sintered assembly to form a smooth unbroken surface whereby a printing head having a plurality of discrete electrodes coplanar with and insulated from a common ground plane is formed.

4,504,341
FABRICATING SHAPED LAMINATED TRANSPARENCIES

John E. Radzwill, Arnold, and Roger F. Bartoli, Natrona Heights, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 419,876, Sep. 20, 1982, abandoned. This application Nov. 7, 1983, Ser. No. 549,051
Int. Cl.[3] B32B *17/00*
U.S. Cl. 156—102 19 Claims

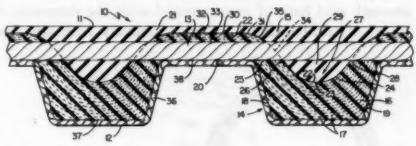


1. A method of simultaneously shaping and laminating a lightweight laminated transparency comprising elements including a pair of outer relatively rigid plies of acrylic or polycarbonate plastic and a flexible interlayer composed of a material selected from the group consisting of polyurethane and plasticized polyvinyl butyral comprising assembling at least one layer of said interlayer material between said pair of relatively rigid plies to form an assembly to be simultaneously shaped and laminated, supporting said assembly to be shaped and laminated on a base of a flexible, non-porous sheet larger in outline than said assembly in such a manner that said sheet forms the bottom wall of a cell and the perimeter of said assembly to be simultaneously shaped and laminated is in spaced relation within a flexible wall of air impervious material enclosing said cell, applying a flexible, non-porous sheet of air impervious material larger in outline than said assembly to the upper surface of said air impervious enclosing wall of said cell and against the upper surface of said assembly to form a roof for said cell, communicating said cell to a vacuum source to put said cell including the interfaces between the elements of said assembly within said cell under subatmospheric pressure, mounting said cell over a vacuum mold having an upward facing shaping surface of concave elevation conforming to the shape desired for said transparency including a vacuum opening so that said cell faces said vacuum opening and forms a collapsible chamber with said mold, supporting the portions of said flexible sheets of air impervious material extending beyond said assembly in fluid-tight relation to said wall enclosing said cell, heating said cell and said assembly while the latter are under vacuum to a deformation temperature of said assembly to sag said cell toward said upper shaping surface and applying vacuum through the vacuum opening of said mold while said cell is so heated and sealed to conform said cell to said shaping surface, the atmospheric pressure above said roof of said cell causing said layers of relatively rigid plastic to laminate to opposite sides of said interlayer while forcing said cell to conform to the shape of said shaping surface and the layers of said assembly within said cell to laminate at a maximum pressure less than ten percent above atmospheric pressure to convert said assembly to a bent laminated transparency, cooling said cell after it conforms to said shaping surface while maintaining said vacuum within said cell until said bent, laminated transparency within said cell retains its shape, separating said cell from said mold and separating said shaped, laminated transparency from said cell.

4,504,342
BELT CONSTRUCTION AND METHOD OF MAKING SAME

Richard L. Marsh, and Robert E. Wetzel, both of Springfield, Mo., assignors to Dayco Corporation, Dayton, Ohio

Filed Jun. 9, 1983, Ser. No. 502,777
Int. Cl.[3] B29H *7/22*; F16G *1/00*
U.S. Cl. 156—138 17 Claims



1. In a method of making a belt construction having opposed sides and comprising a tensile member intermediate said opposed sides, a plurality of teeth defining one of said opposed sides of said belt construction and being mainly formed of a first polymeric material that has reinforcing fibers therein, each tooth having opposed sides that are disposed in spaced relation to adjacent sides of adjacent teeth, said belt construction having a land area between adjacent teeth, and a backing member defining the other of said opposed sides of said belt construction, said backing member being mainly formed from a second polymeric material that is initially separate from said material of said teeth and is substantially free of fibers therein, said material of said backing member having a surface that joins with a surface of each tooth whereby said joining surfaces define an interface line therebetween, said interface line for each tooth extending from said tensile member at a point inboard of one of said opposed sides of the respective tooth into the medial portion of said respective tooth and then back to said tensile member at a point inboard of the other of said opposed sides of said respective tooth whereby part of said material of said backing member defines part of the medial portion of each tooth, said surface of said backing member joining with a surface of said first material in each land area whereby said joining surfaces in each land area define an interface line therebetween, the improvement comprising the steps of providing a grooved drum, disposing said tensile member about said drum, then disposing said first polymeric material about said tensile member, then disposing said second polymeric material about said first polymeric material whereby said second polymeric material is still separate from said first polymeric material, and then subjecting said drum to heat and pressure to cause said first and second material to be forced toward said drum whereby said first material exudes through said tensile member adjacent said grooves and into said grooves and said second material exudes through said tensile member adjacent said grooves and into said grooves to define said interface line for each tooth and whereby said first and second materials form said interface line in each land area to have a portion thereof disposed spaced from said tensile member on the side thereof opposite to the side thereof that faces toward said teeth.

4,504,343
METHOD OF MAKING COMPOSITE MEMBER WITH TRANSVERSE FIBERS

Andrew Green, Fort Worth, Tex., assignor to Composite Technology, Inc., Saginaw, Tex.

Filed May 16, 1983, Ser. No. 494,955
Int. Cl.[3] B32B *1/00, 17/00*
U.S. Cl. 156—177 6 Claims

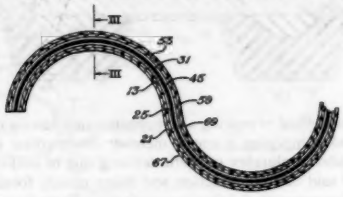
1. A method of constructing a composite member consisting essentially of a corrugated panel having a center layer of longitudinal unidirectional filaments running parallel with the corrugations, sandwiched between transverse layers of parallel, unidirectional filaments, impregnated with resin, and option-

ally including two layers of organic, porous veil material sandwiching the center and transverse layers, comprising the steps of:

drawing a backing web toward a primary bath of resin;

laying down a first transverse layer of parallel, unidirectional filaments onto said backing web transverse to the directional of travel of said backing web as said backing web is drawn toward said bath;

drawing a web of longitudinal unidirectional filaments through said bath of resin parallel with the direction of travel of said backing web simultaneously with said first



transverse layer and said backing web to impregnate said longitudinal filaments and first transverse layer with resin;

laying down a second transverse layer of parallel, unidirectional filaments onto and transverse to said longitudinal filaments;

drawing said second transverse layer, longitudinal filaments, first transverse layer and web of backing material through a secondary bath of resin to form a composite web; and

shaping and curing the composite member thus formed into a corrugated panel with the corrugations running parallel with the longitudinal filaments and with the filaments in the transverse layers remaining parallel with each other.

4,504,344

METHOD OF MANUFACTURING A STICK AND A STICK MANUFACTURED ACCORDING TO SAID METHOD

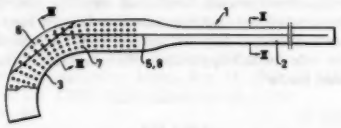
Antti Helle, Tunastigen 60, Luleå, Sweden (951 58), and Villhard Blomkvist, Nätgatan 10, Luleå, Sweden (951 40)

PCT No. PCT/SE82/00148, § 371 Date Jan. 3, 1983, § 102(e) Date Jan. 3, 1983, PCT Pub. No. WO82/03789, PCT Pub. Date Nov. 11, 1982

PCT Filed May 4, 1982, Ser. No. 459,644

Int. Cl.³ B32B *31/00*

U.S. Cl. 156—185 **4 Claims**



1. A method of manufacturing sticks characterized in that a core of polyurethane foam is formed which includes a handle portion and a blade portion, that the foam is caused to set, that a plurality of holes are made in the blade portion, that at least one longitudinal groove is made in the handle portion, that a reinforcing strip is laid into the groove, that a tape of woven glass fabric is wound about the core, that a hose of woven glass fabric is drawn upon the core on the outside of the tape, that a layer of polyester plastic is applied about the entire core with its reinforcements, and that the polyester plastic is caused to set.

4,504,345

TENNIS-BALLS

Robert C. Haines, and Royce Pridgeon, both of Huddersfield, England, assignors to Dunlop Limited, London, England

Filed Jun. 29, 1983, Ser. No. 509,036.

Claims priority, application United Kingdom, Jul. 30, 1982, 8222027; Jan. 18, 1983, 8301264

Int. Cl.³ A63B *45/00*; B32B *31/12*

U.S. Cl. 156—213 **13 Claims**

1. A method of making a tennis-ball wherein a spherical core is covered with twelve substantially identical pentagonally-shaped pieces of a cover material, said method comprising the following stages:

(a) Applying a layer of adhesive to the core;

(b) Restricting the stretching of the cover material by removably bonding to the wearing surface of each piece of the cover material a layer of an adhesive-impermeable barrier material

(c) Applying a layer of adhesive to the reverse surface of each piece of the cover material

(d) Applying twelve of said pentagonally-shaped barrier covered pieces to the core to form an assembly so that each piece is attached to the core by its centre and that the centre of each piece is equidistant from the centre of each adjacent piece and that the edges of each adjacent piece are aligned but not in contact with one another or with the core;

(e) Subjecting the assembly to light radial pressure over its whole surface area, whereby each pentagonally-shaped piece is made to conform to the curvature of the core and the edges of each adjacent piece are urged towards one another without coming into mutual abutment, so that a seam channel is defined by adjacent edges;

(f) Applying adhesive to the whole assembly including at least part of the barrier material so that the seam channel becomes filled with said adhesive;

(g) Treating the assembly so as to release the barrier material from the wearing surface of the cover material;

(h) Subjecting the assembly, to a random rolling action between parallel plates under sufficient load to distort the shape of the core, whereby circumferential pressure is applied to the cover material and adjacent edges of each pentagonally-shaped piece are urged into abutment and adhere to the core.

4,504,346

METHOD OF MANUFACTURING A DAMPED RESONATOR ACOUSTICAL PANEL

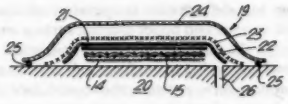
Susan M. Newsam, Derby, England, assignor to Rolls-Royce Limited, London, England

Filed Oct. 12, 1983, Ser. No. 541,315

Claims priority, application United Kingdom, Nov. 30, 1982, 8234126

Int. Cl.³ B32B *31/12*; G10K *11/16*

U.S. Cl. 156—242 **5 Claims**



1. A method of manufacturing a damped resonator acoustical panel including porous acoustical damping parts in which constituent parts are assembled with an adhesive bond between them while the porous acoustical damping parts remain devoid of substantial adhesive contamination, said process comprising the steps of:

(1) laying up a sheet of an open weave fabric which fabric is constituted by a plurality of resin impregnated filaments, and a sheet of a porous acoustical damping fabric,

(2) moulding said sheets by the application of heat and pressure thereto so as to cause a portion of the resin from the filaments of said open weave fabric to flow into and impregnate said acoustical damping fabric and bond said sheets together, the viscosity of said resin being selected such that at the moulding temperature, only those portions of said acoustical damping fabric which abut the filaments of said open weave fabric are impregnated with said resin so that non-abutting portions of said acoustical damping fabric remain unimpregnated and are sound permeable,

(3) applying a film of an adhesive to said open weave fabric,

(4) heating said film by a hot gas stream until it reticulates and forms itself into a network of adhesive which covers only the filaments of the open weave fabric leaving the open areas of said open weave fabric and those portions of said acoustical damping fabric free of adhesive,

(5) applying said bonded sheets to one side of a cellular core having open cells so that said reticulated adhesive film abuts the edges of said open cells and bonds said bonded sheets to said cellular core, and

(6) bonding a solid, sound reflecting sheet to the edges of said open cells on the opposite side of said cellular core in order to fully close the cells thereof.

4,504,347

METHOD OF HOT PRESSING A SYNTHETIC-RESIN LAMINATE

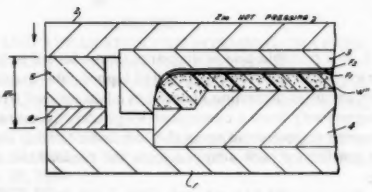
Edmund Munk, and Herbert Haas, both of Oberstenfeld, Fed. Rep. of Germany, assignors to Werzalit Pressholzwerk J. F. Werz Jr. KG, Oberstenfeld, Fed. Rep. of Germany

Continuation of Ser. No. 160,144, Jun. 6, 1980, abandoned, which is a continuation of Ser. No. 7,405, Jan. 29, 1979, abandoned, which is a continuation of Ser. No. 865,740, Dec. 29, 1977, abandoned, which is a continuation of Ser. No. 736,089, Oct. 27, 1976, abandoned. This application Apr. 24, 1981, Ser. No. 257,412

Claims priority, application Fed. Rep. of Germany, Oct. 31, 1975, 2548739

Int. Cl.³ B32B *31/20*

U.S. Cl. 156—245 **4 Claims**



1. A method of making a shaped body with a skin, comprising the following steps in the order named: cold pressing a mass of fibers and a thermosetting binder between a pair of mold halves to form a preform body of a predetermined volume; placing said preform body between a pair of hot mold halves; introducing a spacer between said hot mold halves to define a predetermined distance between said hot mold halves; hot pressing said preform body between said hot mold halves at a temperature above the thermal activation temperature of the binder to convert said preform body into an intermediate body having a secondary volume and a thickness which is smaller than that of said preform body and defined in accordance with said predetermined distance, the thickness of said intermediate body being greater than that of a final integrated body; opening said hot mold halves so as to at least partly dry and degas the intermediate body; removing said spacer from said hot mold halves; placing a skin onto at least a portion of one of the end faces of said intermediate body; and hot pressing said skin and thus degassed intermediate body together to form the final integrated body.

4,504,348

METHOD OF MAKING LABELS FOR CONTAINERS

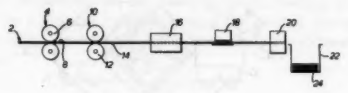
David J. Instance, Past Heap Farm, Pembury, Tunbridge Wells, Kent, England

Filed Dec. 13, 1983, Ser. No. 560,796

Claims priority, application United Kingdom, Dec. 13, 1982, 8235424

Int. Cl.³ B32B *31/18*

U.S. Cl. 156—251 **8 Claims**



1. A method of continuously producing a series of tubular labelling sleeves, which method comprises (a) printing on each of the upper and lower outer faces of a flat tube of resilient material a sequence of desired images, the image on the upper face of the flat tube being printed in register with the image on the lower face of the flat tube; (b) removing the longitudinal edge portions of the flat tube from each of the two sides of the tube; (c) forming at regular intervals a seal across the width of the resilient material so as to seal together the upper and lower sides of the tube, steps (b) and (c) being performed in either order; and (d) severing the tube across its width along the resultant seal thereby to form a tubular sleeve.

4,504,349

METHOD FOR IMPARTING IMPROVED SURFACE PROPERTIES TO A POLYMERIC SHAPED ARTICLE

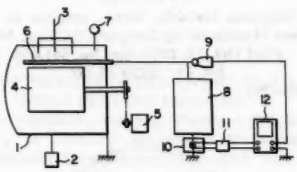
Susumu Ueno, and Hideaki Kamata, both of Ibaraki, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Japan

Filed Sep. 19, 1983, Ser. No. 533,534

Claims priority, application Japan, Sep. 20, 1982, 57-163680

Int. Cl.³ B29C *19/02, 17/08*

U.S. Cl. 156—272.6 **6 Claims**



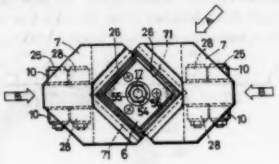
1. A method for imparting improved surface properties to a shaped article of a synthetic polymer having aromatic rings and nitrogen atoms in the backbone chain of the polymer molecule which comprises subjecting the surface of the shaped article to exposure to the atmosphere of low temperature plasma of an inorganic gas under a reduced pressure generated by glow discharge with application of an electric voltage between a grounded electrode and a power electrode, the discharge voltage between the electrodes being at least 4000 volts.

4,504,350

CAP HEAT-SEALING APPARATUS FOR PAPER CONTAINERS

Katsuhiro Joo, Tokushima, Japan, assignor to Shikoku Kakooki Co., Ltd., Tokushima, Japan

Filed Jul. 15, 1983, Ser. No. 514,235
Claims priority, application Japan, Jul. 15, 1982, 57-123941
Int. Cl.³ B32B *31/20*
U.S. Cl. 156—380.8 **2 Claims**



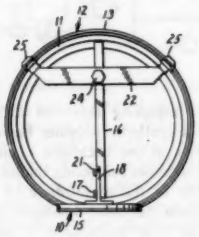
1. A cap heat-sealing apparatus for paper containers comprising a vertically movable head, a fixed pressing member provided on the bottom side of the head and divided movable pressing members arranged around the fixed pressing member and connected to the head so as to be horizontally movable toward or away from the fixed pressing member, the fixed pressing member having an outer periphery shaped in the form of a square, to position along the inner surface of a heat-sealing container opening edge fitting portion of inverted V-shaped cross section formed at the outer periphery of a square paper cap, the paper cap having an aluminum foil layer, the movable pressing members being opposed to each other in a pair with the fixed pressing member positioned therebetween and movable toward and away from each other in a diagonal direction, the opposed surfaces of the movable pressing members being V-shaped when seen from above and defining a square to position along the outer periphery of said fitting portion when brought toward each other, an elastic member being provided on the inner peripheral surface of each of the movable pressing members, a high frequency coil being attached to the vertically movable head at two different levels and surrounding the fixed pressing member so that it positions above and below the elastic member when the pressing members are moved toward each other, the high frequency coil comprising two segments and being shaped in the form of a square ring and further spaced apart from the fixed pressi. g member by a clearance for the fitting portion to enter.

4,504,351

DECORATIVE TAPE DISPENSING AND APPLYING APPARATUS

David L. Antonson, Oakdale, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 13, 1983, Ser. No. 541,456
Int. Cl.³ B32B *35/00*
U.S. Cl. 156—391 **5 Claims**



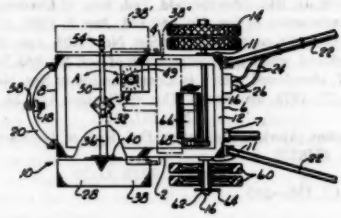
1. A dispenser for applying a narrow strip of decorative film in a circular pattern on a surface within the periphery of a circular body comprising a dispensing device having a frame for supporting a roll of tape and an applicating roller on one edge of the frame, a fixture is pivotally connected to said frame and extends therefrom for positioning the dispensing device on the surface to be striped, said fixture comprises an arm pivotally connected to the frame for movement about an axis generally perpendicular to the axis of the applicating roller and a cross arm adjustably attached to said arm intermediate the ends of said cross arm, said cross arm having guide means at each end for engaging a said circular body for guiding the path of said applicating roller to define a circular path for said applicating roller.

4,504,352

HEAT SEALING APPARATUS

Howard E. Meyer, Slippery Rock, Pa., assignor to Heat Exchange and Transfer, Inc., Carnegie, Pa.

Filed Jul. 1, 1983, Ser. No. 510,279
Int. Cl.³ B32B *31/26*; B44C *7/08*
U.S. Cl. 156—499 **8 Claims**



1. In a portable heat sealing apparatus adapted to be moved forwardly to traverse an elongated lapped joint between adjacent expanses of roofing material in a laid up roof structure to progressively form a continuous longitudinally extending seal between respective adjacent thermoplastic overlap and underlap portions of such a lapped joint, the combination comprising:

a base assembly;

support wheel means for supporting a said base assembly with respect to such a roof structure;

a heating element means adapted to be inserted between such thermoplastic overlap and underlap portions for heating thereof coincident with the forward moving traverse of such a lapped joint by said apparatus to permit the forming of such a longitudinally extending seal;

said heating element means being selectively movable to at least a pair of operative positions to permit said heat seal apparatus to form such a longitudinally extending seal during the forward moving traverse of such a lapped joint in either of opposite directions of travel therealong; and

said support wheel means including a pair of pressure roll means continuously maintained in alignment with said pair of operative positions in following relationship thereto during such forward moving traverse of such a lapped joint to provide positive joining of such overlap and underlap portions under pressure subsequent to heating thereof by said heating element means in either of said operative position.

4,504,353
APPARATUS AND METHOD FOR SEALING AND CUTTING THERMOPLASTIC STRAPS

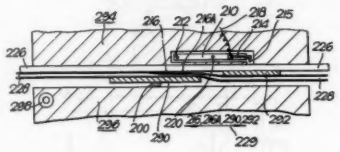
Graham Ford, Cambridge, England, assignor to Gerrard Industries Limited, South Yorkshire, England

Continuation of Ser. No. 401,603, Jul. 26, 1982, abandoned. This application Jan. 27, 1984, Ser. No. 574,204

Claims priority, application United Kingdom, Aug. 5, 1981, 8123902; May 24, 1982, 3215054

Int. Cl.³ B32B *31/00*

U.S. Cl. 156—499 **26 Claims**



1. Apparatus for heat sealing together layers of strap of thermoplastics material, comprising:

a heating and fusing sub-assembly whereat regions of the layers of strap are brought into adjacent relationship, including means for heating said regions of their opposed facing surfaces to effect melting thereof, and

means including at least one resilient pad for pressing the melted surface regions together to effect fusing of the strap layers, said resilient pad forming part of the heating and fusing sub-assembly so as to move in unison with and in the same direction as the heating means,

said heating and fusing sub-assembly including at least one solid backing element which extends between the two strap layers, and

cutting means for severing one strap layer and not the other after fusing the strap layers together, said cutting means including a knife edge which is operable on one of said layers against the backing afforded by said solid backing element.

4,504,354
METHOD AND APPARATUS FOR FORMING GRAVURE CELLS IN A GRAVURE CYLINDER

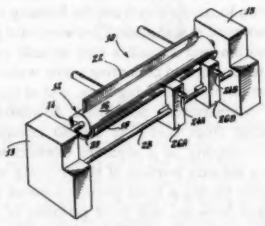
Harvey F. George, West Hempstead, and Yair Toor, Elmhurst, both of N.Y., assignors to Gravure Research Institute, Inc., Port Washington, N.Y.

PCT No. PCT/US82/00892, § 371 Date Aug. 23, 1982, § 102(e) Date Aug. 23, 1982, PCT Pub. No. WO84/00121, PCT Pub. Date Jan. 19, 1984

PCT Filed Jul. 2, 1982, Ser. No. 414,345

Int. Cl.³ C23F *1/02*; B44C *1/22*

U.S. Cl. 156—639 **41 Claims**



1. A method of forming gravure cells in a gravure cylinder for accurately reproducing an image, comprising the steps of:

a. coating the peripheral surface of a gravure cylinder with an insulating coating;

b. revealing a first group of predetermined peripheral portions of the gravure cylinder by selectively removing the insulating coating overlying such portions of the peripheral surface of the gravure cylinder;

c. ablating the first group of revealed portions of the gravure cylinder to a predetermined depth; and

d. repeating the exposing and ablating steps until a predetermined number of different groups of predetermined peripheral portions of the gravure cylinder have been exposed with each previously revealed group of portions having further portions of the gravure cylinder ablated to a greater predetermined depth during each ablating step to provide a gravure cylinder having the desired pattern of cells of the desired depths for accurately reproducing an image.

4,504,355
CONCENTRATOR SYSTEM

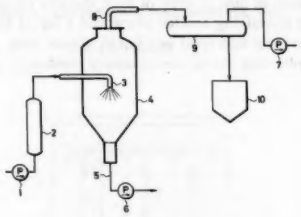
Kazuhiro Yamazaki, Hyogo, and Takamichi Miwa, Osaka, both of Japan, assignors to Daicel Chemical Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 274,563, Jun. 7, 1981, abandoned. This application Nov. 15, 1982, Ser. No. 441,891

Claims priority, application Japan, Jun. 18, 1980, 55-83256

Int. Cl.³ B01D *1/20*

U.S. Cl. 159—3 **12 Claims**



1. A concentrator comprising; a system designed and configured for concentrating an acetyl cellulose polymer solution and including a vacuum source, a heater for preheating said polymer solution; an evaporator having a cylindrical upper part and a lower part in the form of an inverted cone; an inlet pipe for introducing said heated polymer solution from said heater, said inlet pipe having a downwardly opening end positioned in substantially the center of said evaporator; a first outlet pipe for evacuating said evaporator and removing solvent vapor from said evaporator; and a second outlet pipe for recovering concentrated solution from a bottom of said evaporator.

4,504,356
CONTINUOUS PROCESS OF REMOVING SILICA FROM SPENT PULPING LIQUORS

Jürgen Mülder, Mühlheim, and Pedro Gutmann, Kronberg, both of Fed. Rep. of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Feb. 28, 1983, Ser. No. 470,854

Claims priority, application Fed. Rep. of Germany, Jun. 3, 1982, 3208200

Int. Cl.³ D21C *11/04, 5/00*; C02F *1/60*

U.S. Cl. 162—29 **15 Claims**

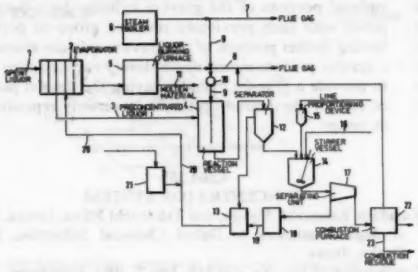
1. In a continuous process of removing silica from spent pulping liquors which have been obtained by the alkaline digestion of annual plants, wherein said liquor is treated with CO_2-containing gas and the precipitated silica is separated, the improvement comprising:

(a) preconcentrating the spent liquor;

(b) treating the spent liquor by contacting the preconcen-

trated liquor with CO_2-containing gas, said CO_2-containing gas being supplied at a rate at 30 to 40 m^3 s.t.p. per m^3 of spent liquor thereby precipitating silica and sodium carbonate from the treated liquor;

(c) removing said precipitated silica and sodium carbonate from the treated liquor;



(d) diluting and washing the removed precipitated silica and sodium carbonate with water and causticizing said removed precipitated silica and sodium carbonate by an addition of lime or milk of lime, thereby obtaining a solid silica containing residue phase and a liquid phase;

(f) separating said solid and liquid phases; and,

(g) combusting the silica-containing residue.

4,504,357

SECURITY WITH IDENTIFYING MARKS PRINTED IN THE SUBSTANCE OF A PAPER LAYER

Hans-Jürgen Holbein, Munich; Paul Leiderer, Neufahrn, and Walter Schneider, Miesbach, all of Fed. Rep. of Germany, assignors to GAO Gesellschaft fuer Automation und Organisation mbH., Munich, Fed. Rep. of Germany

Continuation of Ser. No. 301,093, Sep. 10, 1981, abandoned, which is a continuation of Ser. No. 120,315, Feb. 11, 1980, abandoned. This application Oct. 26, 1983, Ser. No. 545,498

Claims priority, application Fed. Rep. of Germany, Feb. 13, 1979, 2905441

Int. Cl.[3] **D21H** *5/10*

U.S. Cl. 162—123 **8 Claims**

1. Method for manufacturing a paper security with identifying marks printed in the substance of the paper comprising:

forming a non-woven wet fibrous web on a continuously working paper making machine from paper pulp;

continuously passing the wet fibrous web while on the paper making machine past an ink jet printer controlled by micro processor;

printing a pattern onto the wet fibrous web with the ink jet printer;

controlling the ink jet printer to print a desired pattern by a micro processor, said micro processor further controlling the ink jet printer to change or vary the printed pattern on the web while the web is continually being formed on the paper making machine;

adjusting said fibrous web to a desired thickness by adding an additional layer of non-woven fibers to the printed surface of the wet fibrous web on the paper making machine; and

draining, couching and drying said web of desired thickness.

4,504,358

APPARATUS FOR HANDLING WHITE WATER IN A TWIN-WIRE MACHINE

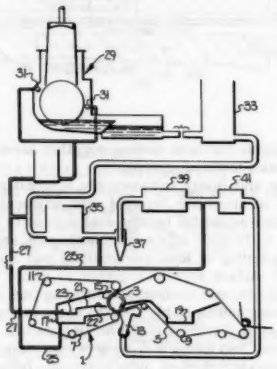
Carl J. N. Hakansson, Karlstad, Sweden, assignor to KMW Aktiebolag, Karlstad, Sweden

Continuation of Ser. No. 269,532, Jun. 2, 1981, abandoned. This application Sep. 14, 1983, Ser. No. 532,229

Claims priority, application Sweden, Jun. 5, 1980, 8004199

Int. Cl.[3] **D21F** *1/66*

U.S. Cl. 162—264 **7 Claims**

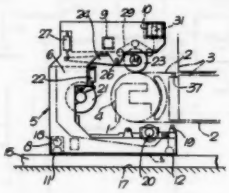


1. A twin-wire papermaking machine comprising a forming roll, a pair of wires mounted for movement along a common curved path around said forming roll, said path defining a curved forming zone from which white water containing suspended matter is thrown radially outwardly during movement of the pair of wires along said curved path around the forming roll, and means for handling the white water removed from the forming zone, said means comprising a saveall located radially out-wardly of the curved forming zone on one side thereof and including a pair of walls defining an enclosure with an opening positioned facing said forming roll and said curved forming zone for receiving and collecting the white water which is thrown outwardly from the curved forming zone, each of said walls extending in a generally horizontal direction and having a front portion located toward said forming zone and a rear portion located away from the forming zone, at least one partition mounted in said saveall between said pair of walls and defining within said saveall a first saveall compartment positioned for receiving and collecting white water discharged from a first portion of the forming zone, and at least one additional saveall compartment positioned downstream in the machine direction from said first saveall compartment for receiving and collecting as a separate fraction white water discharged from another portion of the forming zone, said at least one partition having a front portion located toward said forming zone and between said front portions of said pair of walls, and a rear portion formed in the shape of a channel for conducting away the collected white water fraction, means associated with said first saveall compartment for removing the thus collected white water therefrom, and means associated with said at least one additional saveall compartment for separately removing the thus collected white water therefrom.

4,504,359
ASSEMBLY FOR TREATMENT OF AN ENDLESS WIRE OR FELT

Gunnar Eriksen, Asker, Norway, assignor to Thune-Eureka A/S, Tranby, Norway

Filed Aug. 19, 1982, Ser. No. 409,433
Claims priority, application Norway, Jul. 21, 1982, 822518
Int. Cl.³ D21F 1/32
U.S. Cl. 162—274 4 Claims

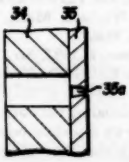


1. An assembly for treatment of an endless wire or felt comprising, in combination, a support roll around which said felt passes, and an independent carriage separate from said support roll and adapted to be moved toward and away from the support roll, said carriage having a first roll mounted therein with its longitudinal axis extending generally parallel to the longitudinal axis of said support roll, said first roll being positioned in said carriage for pressing against the support roll and the felt/wire supported on the support roll when the carriage is in a first position with respect to the support roll; means for heating the first roll and means for driving the first roll in rotation about its longitudinal axis in the carriage; said carriage being dimensioned to permit movement of the carriage to a second position wherein said first roll is positioned inwardly of the support roll above the felt/wire in surface contact with a free unsupported section of the felt.

4,504,360
A HEADBOX IN A PAPER-MAKING MACHINE HAVING A FLOW RECTIFIER

Haruyoshi Fujiwara, Mihara, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 401,980, Jul. 26, 1982, abandoned. This application May 7, 1984, Ser. No. 608,274
Claims priority, application Japan, Jul. 31, 1981, 56-120343; Jul. 31, 1981, 56-120344
Int. Cl.³ D21F 1/02, 1/06
U.S. Cl. 162—343 1 Claim



1. A head box with a top plate and a bottom plate, having a flow rectifier, in a paper-making machine, comprising:

a slice lip having an opening formed by the top plate and the bottom plate at one end of the head box;

a first flow control member having an outlet and being disposed in an upstream side of a main flow passage;

a second flow control member having an outlet and being disposed in a downstream side of, and having a front surface protruding partially across and being in direct contact with, the outlet of the first flow control member;

at least one row of bore means arrayed in a widthwise direction of the first flow control member;

at least one row of slitted flow passages arrayed in a widthwise direction of the second flow control member;

each slitted flow passage having an opening in the widthwise direction of the second flow control member;

each opening in each slitted flow passage being narrower than each bore means in a direction perpendicular to the opening in the slice lip at the outlet of the first flow control member;

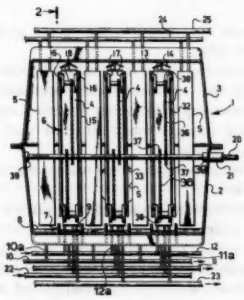
each opening in each slitted flow passage being parallel to the opening in the slice lip;

whereby flow through the main flow passage is throttled at the front surface of the second flow control member so that the flow is rapidly decelerated in the openings of the slitted flow passages to a uniform flow rate distribution in the widthwise direction across the entire outlet of the second flow control member before exiting through the parallel opening in the slice lip in order to eliminate streaks of raw paper liquid with low concentration of fibers.

4,504,361
BLOCK SHORT-WAY EVAPORATOR WITH WIPED-OFF FILM

Alexander Tkac, and Jan Cvenglos, both of Bratislava, Czechoslovakia, assignors to Slovenska vysoka skola technicka v Bratislava, Bratislava, Czechoslovakia

Filed Jun. 15, 1982, Ser. No. 388,741
Claims priority, application Czechoslovakia, Jun. 22, 1981, 4670-81
Int. Cl.³ B01D 1/22
U.S. Cl. 202—172 8 Claims



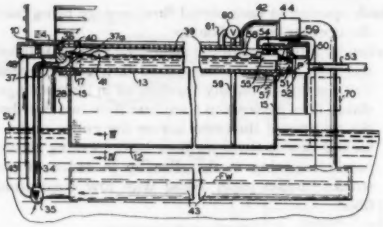
1. A block short-way evaporator with wiped-off film, comprising a vacuum chamber containing a plurality of spaced parallel vertical double-sided flat evaporators, wipers for wiping the flat evaporating areas of the evaporators, frames which are capable of orbital motion in respective vertical planes, the wipers being supported on the frames, double-sided flat condensers in the chambers disposed in alternation with the evaporators so that they form a continuous block, on the bottom of the chamber there being distillate collecting troughs with distillate outlet tubes, the distillate collecting troughs being disposed below the double-sided flat condensers and being formed by separating partitions, residue collecting troughs alternating with the distillate collecting troughs and disposed below the double-sided flat evaporators, the residue collecting troughs being provided with residue outlet tubes, and feed tubes which are led through the bottom of the chamber and the double-sided flat evaporators into separating troughs in the upper part of the double-sided flat evaporators, the wipers being supported on the frames, the frames being rectangular in shape, the means for driving the frames in orbital motion comprising eccentric means disposed in driving engagement with the respective corners of the frame, and means for driving all of said eccentric means in synchronism.

4,504,362

SOLAR DESALINATION SYSTEM AND METHOD

Clifford L. Kruse, 326 S. Myrtle St., Villa Park, Ill. 60181

Filed Sep. 13, 1982, Ser. No. 416,383
Int. Cl.³ B01D *3/04*
U.S. Cl. 203—3 **22 Claims**



1. In a solar desalination system in which fresh water is derived from sea water:

an elongate solar ray collecting reflector, which is adapted for focussing solar ray energy for heating a respective evaporator tube located at substantially the focal apex of the reflector;

means for delivering sea water to said evaporator tube;

means for controlling said means for delivering sea water and adapted for maintaining a predetermined level of the sea water to be evaporated within said evaporator tube so as to provide for vapor chamber space above the water in the tube;

passage means for withdrawing vapor generated in said evaporator tube;

means for receiving vapor from said evaporator tube and for condensing the vapor into fresh water, and as an incident to the condensing developing at least some vacuum suction in said passage means toward said receiving and condensing means;

means for withdrawing the fresh water condensate from said receiving means;

means for intermittently withdrawing sea water concentrate from said evaporator tube;

and a water density responsive means in contact with the sea water in said evaporator tube and responsive to the density of such sea water for controlling said means for intermittently withdrawing sea water concentrate.

4,504,363

PREPARATION OF CIS-2,6-DIMETHYLMORPHOLINE

Norbert Goetz, Worms; Bjoern Girgensohn, Mannheim, and Fritz Zanker, Worms, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

Filed May 5, 1983, Ser. No. 491,778
Claims priority, application Fed. Rep. of Germany, May 13, 1982, 3217964
Int. Cl.³ C07B *5/00*
U.S. Cl. 203—14 **4 Claims**

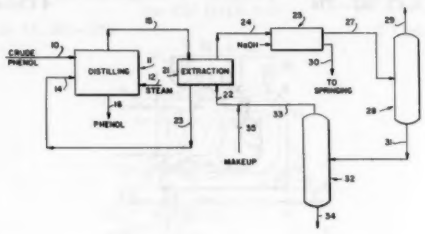
1. A process for the preparation of 2,6-dimethylmorpholine containing a high proportion of the cis-isomer which comprises: simultaneously metering diisopropanolamine containing from 0 to 20% of water and excess 90–120% strength sulfuric acid into the reaction zone of a reactor; stirring the reaction mixture without cooling to increase the temperature of the mixture to from 85°–170° C.; heating the reaction mixture at a temperature of from 150° to 190° C. for from 1 to 25 hours while water is distilled off; contacting the reaction mixture with a sodium hydroxide solution and distilling the resulting mixture to obtain a crude product containing 2,6-dimethylmorpholine and drying the crude product that is obtained, with sodium hydroxide, to form 2,6-dimethylmorpholine having a high proportion of the cis-monomer.

4,504,364

PHENOL PURIFICATION

Jamin Chen, Montville; Ali M. Khonsari, Bloomfield, and George D. Suciu, Ridgewood, all of N.J., assignors to The Lummus Company, Bloomfield, N.J.

Filed Jun. 28, 1982, Ser. No. 392,568
Int. Cl.³ C07C *37/76*
U.S. Cl. 203—45 **11 Claims**



1. A process for purifying phenol comprising:

distilling in the presence of water a crude phenol containing impurities comprising methylbenzofuran to recover as separate streams a mixture of phenol and water, containing said impurities, and phenol having a reduced quantity of impurities;

contacting the recovered mixture with a water immiscible extraction solvent to extract impurities from said mixture, said contacting being effected at a temperature at which the water and phenol in the mixture are completely miscible to provide said water-phenol mixture (is) as a single-phase liquid, said extraction solvent being employed in an amount whereby at least 60% of the phenol of the recovered mixture is contained in a remaining mixture of water and phenol; and

separating the solvent containing extracted impurities from the remaining mixture of water and phenol, said remaining mixture containing at least 60% of the phenol in the recovered mixture subjected to said contacting.

4,504,365

NON-DESTRUCTIVE CATHODIC DISBONDMENT TESTING OF PIPEWRAP COATINGS

Jordan D. Kellner, Wayland, Mass., assignor to The Kendall Company, Boston, Mass.

Filed Nov. 1, 1982, Ser. No. 438,106
Int. Cl.³ G01N *27/30, 27/46*
U.S. Cl. 204—1 T **8 Claims**

1. A method of evaluating the corrosion protection afforded to a metallic surface by a surface coating thereon, by measuring the extent of cathodic disbondment, wherein said metallic surface is contacted by an electrolyte fluid, comprising the steps of:

establishing and equilibrating a circuit path through a working test pipe electrode and a counter electrode in said electrolyte fluid, in which said test pipe electrode achieves a state of cathodic protection;

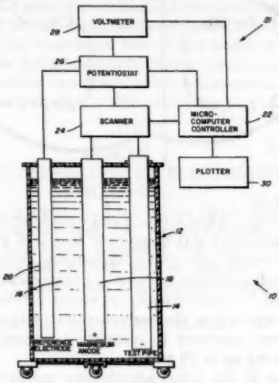
disconnecting said cathodically protected working test pipe electrode from said counter electrode;

re-establishing a circuit path through said working test pipe electrode, said counter electrode, and a reference electrode, in said

electrolyte fluid, along with an electronic control and measuring means;

causing a measured known voltage step to be applied to said working test pipe electrode;

measuring the current flowing after application of said measured applied voltage step; and



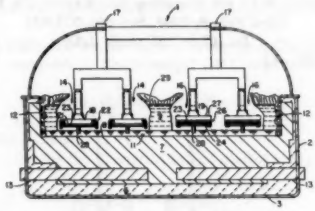
analyzing said current flow data and thereby determining the double layer capacitance at the interface between said working test pipe electrode and said electrolyte fluid.

4,504,366

SUPPORT MEMBER AND ELECTROLYTIC METHOD

Noel Jarrett, and Thomas R. Hornack, both of Lower Burrell, Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Apr. 26, 1983, Ser. No. 488,756
Int. Cl.³ C25B *1/40*; C25C *3/00, 3/06, 7/02*
U.S. Cl. 204—1 R **29 Claims**



18. A method of electrolysis comprising:

establishing a first electrode in relative position to a second electrode in an electrolytic cell to form an interelectrode zone of specified dimension for containing an electrolyte;

supporting said first electrode from said second electrode, wherein said first electrode is supported on a shoulder pin, a support bracket, or hanger essentially free from support by an internal cell surface for containing said electrolyte and said pad; and

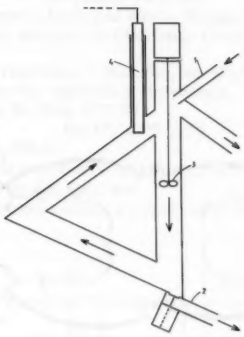
connecting said first or second electrode electrically with a separate liquid pad of higher conductivity than said electrolyte.

4,504,367

MONITORING OF CHEMICAL SPECIES IN SOLUTION AND APPARATUS THEREFOR

Alan M. Bond, Toorak; Henry A. Hudson, Queenscliff; Pierre A. van den Bosch, Portarlington, and Frederick L. Walter, Belmont, all of Australia, assignors to Deakin University, Australia

Filed May 16, 1983, Ser. No. 495,237
Claims priority, application Australia, May 14, 1982, PF4018/82
Int. Cl.³ G01N *27/28*
U.S. Cl. 204—1 T **8 Claims**



1. A method for determining the concentration of a chemical species in solution using an ion-selective electrode assembly including sensing and reference electrodes, comprising the steps of:

(i) passing, a sample of solution containing the chemical species to be determined into a closed-loop cell containing an ion-selective electrode assembly, said sample being mixed either prior to or upon entering the cell with a reagent for reducing the interference of unwanted substances with the ion-selective electrode assembly;

(ii) recirculating the sample and reagent within the closed-loop cell under turbulent flow conditions; and

(iii) measuring the concentration of the chemical species to be determined while it is circulating in the cell by means of the ion-selective electrode assembly, said ion-selective electrode assembly having sensing and reference electrodes arranged transversely to the direction of flow of the solution to sense the same portion of the solution simultaneously.

5. An apparatus for use in determining the concentration of a chemical species in solution, said apparatus comprising:

(I) a flow-through closed-loop cell, constructed so as to provide a turbulence producing path for the solution . which flows through it;

(II) means to recirculate the solution within the cell; and

(III) an ion-selective electrode assembly including sensing and reference electrodes arranged to project into the circulating solution and further arranged so that the sensing and reference electrodes are traverse to the direction of flow of the solution to sense the same portion of the solution simultaneously.

4,504,368

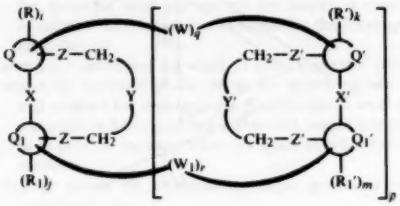
ALKALI METAL ION-SELECTIVE COMPOSITIONS AND ELEMENTS AND A METHOD OF USING SAME

Mary H. Delton, Honeoye Falls, and Daniel S. Daniel, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 18, 1983, Ser. No. 514,744
Int. Cl.³ G01N *27/30*
U.S. Cl. 204—1 T **22 Claims**

7. An ion-selective electrode having an ion-selective membrane composition comprising

(a) an ionophore which is a crown ether containing one or more ether linkages and represented by the structure:



wherein

p is 0 or 1; when p is 1, q and r are independently 0 or 1, and when p is 0, q and r are both 0; X and X′ are independently azo, azoxy, azomethine, vinylene, sulfoxyl, oxydimethylene, ureylene or iminodicarbonyl;

Y and Y′ independently represent a bond or a linking group having the carbon, sulfur, nitrogen or oxygen atoms necessary to complete a crown ring backbone having up to 29 atoms;

Z and Z′ are independently oxy, methyleneoxy, imino, amido or oxycarbonyl;

R, R_1, R′ and R_1′ are independently alkyl, aryl, cycloalkyl, a heterocycle, alkoxy, amino, acylamino, amido, keto, carbamoyl, carboxy, alkoxycarbonyl, cyano, halo or nitro or another substituent group having up to 60 carbon, sulfur, nitrogen or oxygen atoms in the backbone;

i, j, k and m are independently zero or a positive integer up to a number such that Q, Q_1, Q′ or Q_1′ is fully substituted, respectively;

Q, Q_1, Q′ and Q_1′ are independently the atoms necessary to complete a 5- to 14-membered mono- or polycyclic ring; and

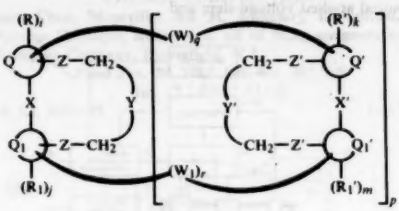
W and W_1 are independently linking groups having up to 60 carbon, sulfur, nitrogen or oxygen atoms in the backbone;

(b) a compound capable of solvating said crown ether; and

(c) a supporting matrix.

18. A method for determining the concentration of an alkali metal ion in a specimen sample, said method comprising physically contacting said sample with an electrode sensitive to said alkali metal ion, said electrode comprising a membrane composition sensitive to said alkali metal ion, said composition comprising:

(a) a crown ether ionophore containing one or more ether linkages and represented by the structure



wherein

p is 0 or 1; when p is 1, q and r are independently 0 or 1, and when p is 0, q and r are both 0; X and X′ are independently azo, azoxy, azomethine, vinylene, sulfoxyl, oxydimethylene, ureylene or iminodicarbonyl;

Y and Y′ independently represent a bond or a linking group having the carbon, sulfur, nitrogen or oxygen atoms necessary to complete a crown ring backbone having up to 29 atoms;

Z and Z′ are independently oxy, methyleneoxy, imino, amido or oxycarbonyl;

R, R_1, R′ and R_1′ are independently alkyl, aryl, cycloalkyl, a heterocycle, alkoxy, amino, acylamino, amido, keto, carbamoyl, carboxy, alkoxycarbonyl, cyano, halo or nitro or another substituent group having up to 60 carbon, sulfur, nitrogen or oxygen atoms in the backbone;

i, j, k and m are independently zero or a positive integer up to a number such that Q, Q_1, Q′ or Q_1′ is fully substituted, respectively;

Q, Q_1, Q′ and Q_1′ are independently the atoms necessary to complete a 5- to 14-membered mono- or polycyclic ring; and

W and W_1 are independently linking groups having up to 60 carbon, sulfur, nitrogen or oxygen atoms in the backbone;

(b) a compound capable of solvating said crown ether; and

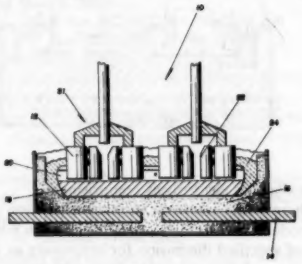
(c) a hydrophobic polymer binder.

4,504,369

METHOD TO IMPROVE THE PERFORMANCE OF NON-CONSUMABLE ANODES IN THE ELECTROLYSIS OF METAL

Rudolf Keller, R.D. #3, Roundtop Rd., Export, Pa. 15632

Filed Feb. 8, 1984, Ser. No. 578,021
Int. Cl.³ C25C *3/00, 3/06*
U.S. Cl. 204—67 **13 Claims**



1. A method for electrolytically producing a metal from an electrolyte melt containing a metal compound being electrolyzed where the life and performance of an inert, non-consumable anode is improved, and where said anode consists of at

least one constituent compound that slowly dissolves in the electrolyte, the steps comprising:

adding amounts of a critical component of constituent compound of said inert, non-consumable anode to said electrolyte melt in a manner that said component dissolves to an extent that the dissolution rate of said anode is reduced, said amounts being selected to correspond to a percentage of the dissolution rate of said anode constituent compound experienced without any said addition.

4,504,370

METHOD AND APPARATUS FOR ELECTROCHEMICAL MACHINING

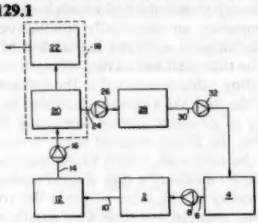
Horst J. Lindner; Peter P. Ufer; Klaus Heck, and Gerhard Schmöger, all of Ingolstadt, Fed. Rep. of Germany, assignors to Audi Nsu Auto Union, Ingolstadt, Fed. Rep. of Germany

Filed Feb. 3, 1984, Ser. No. 576,900

Claims priority, application Fed. Rep. of Germany, Feb. 2, 1983, 3303585

Int. Cl.³ B23P *1/00, 1/16, 1/02*

U.S. Cl. 204—129.1 **8 Claims**



1. A process for electorchemical machining of the surface of an iron-containing workpiece comprising: delivering to a work station sodium nitrate-containing electrolytes for removing metal from the workpiece; adding substantially continuously ozone as an oxidizing agent to electrolyte withdrawn from the work station to oxidize the nitrite formed during the metal removing step; and returning the oxidized nitrite as nitrate in the electrolyte to the work station.

4,504,371

PROCESS FOR THE PHOTOCATALYTIC ISOMERIZATION OF OLEFINS UTILIZING A MIXED METAL CLUSTER

Larry M. Cirjak, Burton, and Lynne Sutherland, Cleveland, both of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Filed Feb. 13, 1984, Ser. No. 579,258

Int. Cl.³ B01J *19/12;* **C07C** *5/23, 5/25*

U.S. Cl. 204—158 R **26 Claims**

1. A process for the isomerization of olefins comprising the steps of:

forming a solution which comprises:

an olefin; and,

a photocatalytic mixed metal cluster, said cluster having the empirical formula

$$(C_nR_{n'})_aFe_bM_c(CO)_dL_e$$

wherein n is five;

wherein R' is selected from the group consisting of hydrogen, methyl, ethyl, acetyl, formyl, bromine, chlorine and fluorine;

wherein M is a transition metal other than iron;

wherein L is a Group V type ligand; and

wherein

a=1 to 5

b=1 to 5

c=1 to 5

b+c=2 to 6

d=5 to 18 with the proviso

that d is always equal to or greater than b+c, and

e=0 to 18;

irradiating said solution and allowing isomerization to occur.

4,504,372

ACID-CURABLE COMPOSITION CONTAINING A MASKED CURING CATALYST, AND A PROCESS FOR ITS PREPARATION

Rudolf Kirchmayr, Aesch, and Werner Rutsch, Reinach, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Mar. 2, 1983, Ser. No. 471,557

Claims priority, application Switzerland, Mar. 12, 1982, 1557/82; Sep. 21, 1982, 5577/82

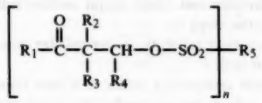
Int. Cl.³ C08F *2/50*

U.S. Cl. 204—159.15 **17 Claims**

1. A curable composition which comprises

(a) an acid-curable resin, and

(b) as the curing catalyst, a compound of formula I



(I)

in which

n is the number 1 or 2;

R_1 is anthryl, phenanthryl, phenyl, naphthyl or said phenyl or said naphthyl substituted by benzoyl or by 1, 2 or 3 radicals selected from the group consisting of —Cl, —Br, C_1–C_8-alkyl, phenyl, C_1–C_8-alkoxy, phenoxy, benzyloxy, C_1–C_8-alkylthio, phenylthio, $-SCH_2CH_2OH$, C_1-C_4-alkyl-CONH-, benzoylamino and dimethylamino;

R_2 is hydrogen, —OH, C_1–C_4-alkoxy, $-OSi(CH_3)_3$, $-OCOCH_3$, C_1–C_8-alkyl or said alkyl substituted by phenyl;

R_3 is hydrogen, C_1–C_8-alkyl or said alkyl substituted by phenyl, by —CN, by benzoyl, by C_1–C_4alkylcarbonyl or by C_2–C_5-alkoxycarbonyl;

R_4 is hydrogen, C_1–C_8-alkyl, said alkyl substituted by —OH, by —Cl or by phenyl; phenyl, said phenyl substituted by —OH, by —Cl, by C_1–C_4-alkyl or by C_1–C_4-alkoxy; C_2–C_6-alkenyl, C_8–C_9-phenylalkenyl, furyl, thienyl, $-CCl_3$, C_5–C_6-cycloalkyl or C_5–C_6-cycloalkenyl; or

R_1 and R_3, R_3 and R_4 and R_2 and R_3, together with the carbon skeleton to which they are bonded, form a 5-membered or 6-membered ring which contains 1 to 5 $-CH_2-$, $-CH(CH_3)-$, $-C(CH_3)_2-$, —O—, —S—, —SO—, $-SO_2-$, —CO—, $-N(CO\text{-}C_1\text{-}C_4\text{-alkyl})$- or $-N(COC_6H_5)-$ groups, and

when n is 1, R_5 is C_5–C_6-cycloalkyl, C_7–C_9-aralkyl, camphoryl, $-CF_3$, $-CCl_3$, —F, $-NH_2$, C_1–C_{18}-alkyl, phenyl, said phenyl substituted by —Cl, —OH, C_1–C_{12}-alkyl, C_1–C_4-alkoxy, C_1–C_4-alkyl-CONH—, benzoylamino, $-NO_2$ or benzoyl; naphthyl, or said naphthyl substituted by —Cl, C_1–C_{12}-alkyl or C_1–C_4-alkoxy, or when n is 2, R_5 is a $-(CH_2)_m$ group, in which m is a number from 2 to 8; phenylene, C_1–C_{12}-alkyl-substituted phenylene or naphthylene.

4,504,373

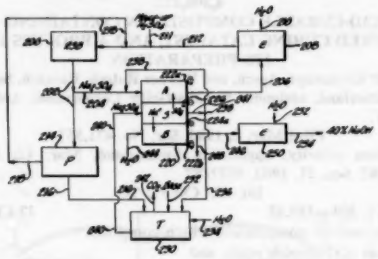
ELECTRODIALYTIC WATER SPLITTING PROCESS AND APPARATUS FOR CONVERSION OF ALKALI METAL SULFATE VALUES DERIVED FROM SPENT RAYON SPIN BATHS

Krishnamurthy N. Mani, Denville, and Frederick P. Chlanda, Rockaway, both of N.J., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Continuation-in-part of Ser. No. 383,879, Jun. 1, 1982, abandoned. This application May 2, 1983, Ser. No. 487,651

Int. Cl.[3] B01D *13/02*

U.S. Cl. 204—180 P 29 Claims



1. A process for converting alkali metal sulfate values into alkali metal hydroxide and alkali metal sulfate/sulfuric acid which comprises the steps of:

(a) providing an electrodialytic water splitter comprising at least one unit cell;

(b) feeding liquid comprising water to a base compartment of each unit cell of the electrodialytic water splitter;

(c) feeding liquid comprising spent rayon spin bath liquor containing alkali metal sulfate values to an acid compartment of each unit cell of the electrodialytic water splitter;

(d) passing current through the electrodialytic water splitter to produce a reaction liquid comprising alkali metal sulfate/sulfuric acid in the acid compartment of each unit cell of the electrodialytic water splitter, and a reaction liquid comprising alkali metal hydroxide in said base compartment of each unit cell of the electrodialytic water splitter.

4,504,374

ULTRAVIOLET CURED COATING METHOD TO PROVIDE STONE CHIP RESISTANCE

Ronald J. Lewarchik, Arlington Hgts.; Edward J. Murphy, Mt. Prospect, and Elaine C. Beeks, Rolling Meadows, all of Ill., assignors to DeSoto, Inc., Des Plaines, Ill.

Filed Mar. 9, 1983, Ser. No. 473,547

Int. Cl.[3] C25D *13/08;* B05D *3/06;* C08F *2/48*

U.S. Cl. 204—181 C 16 Claims

8. A method of providing a stone chip-resistant finish to the undersurface of an automobile comprising applying to an automobile undersurface primed with a cross-linked amine-functional polymer primer, a cationically curable polyepoxide, polyhydric alcohol and/or water, and a photoinitiator and/or photosensitizer for an ultraviolet-activated cationic cure, said liquid mixture being applied at a resin solids content of at least about 50% and in a thickness to provide a cured coating of at least about 2 mils thick, and curing the wet coating by exposing the same to ultraviolet light.

9. A method as recited in claim 8 in which said cross-linked amine-functional polymer primer is deposited from aqueous dispersion by cathodic electrodeposition in combination with a curing agent and is baked to cure the same.

4,504,375

ANODE ELEMENT FOR USE IN A CATHODIC PROTECTION SYSTEM

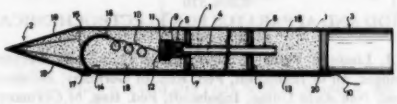
Geurt Griffioen, Lienden, Netherlands, assignor to Hommema Van 1825 B.V., Duurstede, Netherlands

Filed Jan. 25, 1984, Ser. No. 573,877

Claims priority, application Netherlands, Jan. 31, 1983, 8300352

Int. Cl.[3] C23F *13/00*

U.S. Cl. 204—196 8 Claims



1. An anode element for use in a cathodic protection system and provided with a metal tube, the one extremity of which is pointed and the other extremity of which is adapted to be acted upon by an impactor, an electrically conductive rod disposed within the tube aligned with the center line of the tube and spaced from the tube wall and having a length smaller than the tube, a connecting cable connected to the rod and extending to the outside of the tube via a passage provided in the tube wall, and a quantity of granular carbon-containing filling material within the tube, the filling material being in contact with the rod and with the tube wall, which filling material can be kept within the tube by means of a disk-shaped sealing provided at the other extremity of the tube, wherein the rod is disposed within the filling material in a somewhat axially movable manner, while during the displacement of said rod the connecting cable in the vicinity of the connection thereof with the rod is capable of moving along, and the outer wall of the tube including the extrimities is substantially smooth in an axial direction, said outer wall of the tube being provided with a pipe having a smaller diameter than that of the tube, said pipe extending parallel to the center line of the tube from the passage to the other extremity of the tube, the connecting cable extending outside the tube from the passage through the pipe.

4,504,376

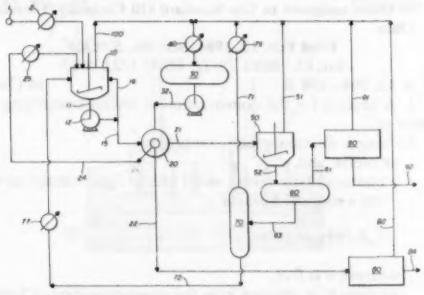
UREA DEWAXING OF NAPHTHENE OILS

Theodore C. Mead, Port Neches, and James H. Wright, Houston, both of Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Apr. 9, 1984, Ser. No. 598,101

Int. Cl.[3] C10G *73/24*

U.S. Cl. 208—25 6 Claims



1. In a process for dewaxing a naphthenic lubricating oil distillate charge stock containing less than 2 wt% n-paraffin the process comprising mixing the naphthenic oil with urea in the presence of an organic solvent and forming solid, n-paraffin-urea adducts, separating the adducts from the solution thereby producing dewaxed naphthenic oil, decomposing or

extracting the separated adducts, recovering and recycling the urea and optionally, recovering the n-paraffins, the improvement which comprises:

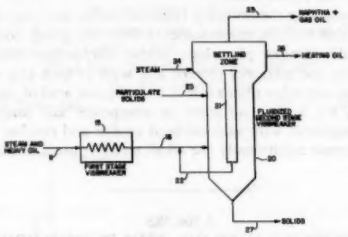
a. chilling the naphthenic lubricating oil distillate charge stock to a temperature of 60° F. to 65° F.;
b. admixing granulated, solid urea with urea dewaxing solvent, the amount of urea being a multiple of the amount required for the complete conversion of the n-paraffin to n-paraffin-urea adduct; to form a slurry;
c. chilling the slurry to 60° F. to 65° F.;
d. vigorously mixing the naphthenic lubricating oil distillate charge stock with the slurry for 3 to 4 hours to form an n-paraffin-urea adduct;
e. separating from the mixture of step (d) a solids-free solution of dewaxed lubricating oil.

4,504,377

PRODUCTION OF STABLE LOW VISCOSITY HEATING OIL

Paul Shu, Princeton Junction, N.J., and Tsoung Y. Yan, Philadelphia, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 9, 1983, Ser. No. 559,670
Int. Cl.³ C10G *51/02*
U.S. Cl. 208—75 **13 Claims**



13. A process for increasing the production of stable heating oil from heavy oil feedstock by improving visbreaking performance in steps which comprise (1) heat-treating a mixture of heavy oil feedstock and steam in a first stage visbreaking zone at the highest Severity that yields less than about 0.5 weight percent coke deposition; (2) introducing the first stage visbroken effluent into a second stage visbreaking zone containing a bed of particulate coke solids, and heat-treating the said visbroken effluent at the highest Severity that deposits toluene-insolubles on the particulate coke solids and yields a second stage visbroken effluent with not more than about 0.5 weight percent toluene-insoluble content; separating the second stage visbroken effluent from the particulate solids and (3) fractionating the second stage visbroken effluent to provide a stable low viscosity heating oil product.

4,504,378

SODIUM TETRACHLOROALUMINATE CATALYZED PROCESS FOR THE MOLECULAR WEIGHT REDUCTION OF LIQUID HYDROCARBONS

Mark A. Plummer, Littleton, Colo., assignor to Marathon Oil Company, Findlay, Ohio

Filed Feb. 18, 1983, Ser. No. 467,698
Int. Cl.³ C10G *11/08, 19/067, 29/12, 47/08*
U.S. Cl. 208—108 **30 Claims**

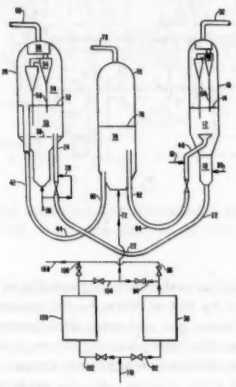
1. A process for reducing the molecular weight of a high molecular weight hydrocarbon feedstock comprising contacting said feedstock with a molten tetrachloroaluminate catalyst consisting essentially of $NaAlCl_4$, having substantially no excess NaCl or $AlCl_3$, at a pressure above atmospheric and at elevated temperature to produce a liquid product slate wherein substantially all of the components in said product slate exhibit a lower molecular weight than the molecular weight range exhibited by said feedstock.

4,504,379

PASSIVATION OF METAL CONTAMINANTS IN CAT CRACKING

Gordon F. Stuntz, and Robert C. Schucker, both of Baton Rouge, La., assignors to Exxon Research and Engineering Co., Florham Park, N.J.

Filed Aug. 23, 1983, Ser. No. 525,787
Int. Cl.³ C10G *11/00*
U.S. Cl. 208—113 **25 Claims**



1. In a cracking process, a method for reducing the adverse catalytic effects of metal contaminants selected from the group consisting of nickel, vanadium, iron and mixtures thereof present in a feedstock, said method comprising:

A. contacting the feedstock containing the metal contaminant with cracking catalyst in a reaction zone under cracking conditions to produce cracked product and coke, coke and metal contaminant being deposited on cracking catalyst;
B. passing coke and metal contaminated catalyst from the reaction zone to a regeneration zone maintained under regeneration conditions to remove coke from the catalyst; and,
C. passing metal contaminated catalyst through a passivation zone maintained under reducing conditions at an elevated temperature prior to the catalyst being returned to the reaction zone, the improvement wherein the reducing conditions are maintained in the passivation zone by passing process reducing gas through a guard zone adapted to remove an unsaturated hydrocarbon compound from the reducing gas prior to the reducing gas entering the passivation zone.

4,504,380

PASSIVATION OF METAL CONTAMINANTS IN CAT CRACKING

Gordon F. Stuntz, Baton Rouge, La., and Terry A. Reid, Florham Park, N.J., assignors to Exxon Research and Engineering Co., Florham Park, N.J.

Filed Aug. 23, 1983, Ser. No. 525,826
Int. Cl.³ C10G *11/00*
U.S. Cl. 208—113 **23 Claims**

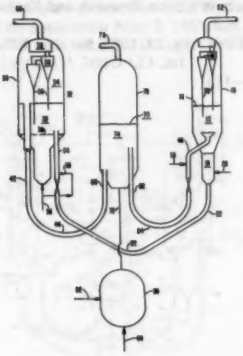
1. In a cracking process, a method for reducing the adverse catalytic effects of metal contaminants selected from the group consisting of nickel, vanadium, iron and mixtures thereof, said method comprising:

A. contacting the feedstock containing the metal contaminant with a cracking catalyst in a reaction zone under cracking conditions to produce cracked product and coke,

coke and metal contaminant being deposited on cracking catalyst;

B. passing coke and metal contaminated catalyst from the reaction zone to a regeneration zone maintained under regeneration conditions to remove coke from the catalyst; and,

C. passing metal contaminated catalyst through a passivation



zone maintained under reducing conditions at an elevated temperature by the addition to the passivation zone of process reducing gas containing an unsaturated hydrocarbon prior to the catalyst being returned to the reaction zone, the improvement wherein the unsaturated hydrocarbon content of the process reducing gas is decreased prior to the addition of the process reducing gas to the passivation zone.

4,504,381

PASSIVATION OF CRACKING CATALYSTS WITH CADMIUM AND TIN

Carl F. Bertsch, Baton Rouge, La., assignor to Exxon Research and Engineering Co., Florham Park, N.J.

Filed Dec. 9, 1983, Ser. No. 559,918

Int. Cl.³ C10G *11/00*; B01J *37/18*

U.S. Cl. 208—113 **14 Claims**

1. A method for passivating cracking catalyst in a cracking system comprising a reaction zone, a regeneration zone, and a passivation zone, said method comprising:

(a) passing feedstock containing a metal contaminant selected from the group consisting of nickel, vanadium, iron and mixtures thereof into the reaction zone maintained under reaction conditions having cracking catalyst therein, coke and metal contaminant becoming deposited on the cracking catalyst;

(b) passing cracking catalyst from the reaction zone to the regeneration zone maintained under regeneration conditions wherein at least a portion of the coke is removed from the catalyst;

(c) passing metal contaminated cracking catalyst from the regeneration zone through the passiviation zone containing a hydrogen containing gas maintained under passivation conditions prior to returning the cracking catalyst to the reaction zone; and,

(d) adding a passivation promoter to the cracking system, the passivation promoter comprising effective amounts of cadmium and tin to reduce the adverse catalytic effects of the metal contaminant.

4,504,382

PHOSPHORUS-CONTAINING CATALYST AND CATALYTIC CRACKING PROCESS UTILIZING THE SAME

Lloyd A. Pine, Baton Rouge, La., assignor to Exxon Research and Engineering Co., Florham Park, N.J.

Division of Ser. No. 434,201, Oct. 14, 1982, Pat. No. 4,465,780. This application Apr. 3, 1984, Ser. No. 596,427

Int. Cl.³ C10G *11/05*

U.S. Cl. 208—114 **14 Claims**

1. A catalytic cracking process comprising contacting a hydrocarbonaceous feed at catalytic cracking conditions with a catalyst comprising a Y-type crystalline aluminosilicate zeolite prepared from a clay starting material, a residue derived from said clay, and at least about 0.1 weight percent phosphorus, based on the weight of said zeolite plus residue, said Y-type crystalline aluminosilicate zeolite having the structure of faujasite and having a silica to alumina mole ratio of at least about 3:1, said catalyst having been prepared initially by the steps which comprise:

(a) ion exchanging a clay derived alkali metal-containing Y-type crystalline aluminosilicate zeolite and the clay derived residue with a cation other than an alkali metal to decrease the alkali metal content of said alkali metal-containing zeolite;

(b) calcining the resulting ion exchanged zeolite and clay derived residue, and

(c) contacting the resulting calcined zeolite and clay derived residue with an anion selected from the group consisting of dihydrogen phosphate anion, dihydrogen phosphite anion and mixtures thereof and with at least one ammonium salt other than a salt of an inorganic acid of phosphorus, for a time sufficient to composite said amount of phosphorus with said calcined zeolite and residue and to decrease additionally the alkali metal content of said zeolite.

4,504,383

REREFINING USED OIL WITH BOROHYDRIDE REDUCING AGENTS

Richard H. O'Blasny, Natchitoches, La., assignor to Delta Central Refining, Inc., Natchitoches, La.

Continuation-in-part of Ser. No. 336,900, Jan. 4, 1982, Pat. No. 4,439,311. This application Feb. 8, 1984, Ser. No. 578,357

The portion of the term of this patent subsequent to Mar. 27, 2001, has been disclaimed.

Int. Cl.³ C10G *7/10, 7/00*; C10M *11/00*

U.S. Cl. 208—179 **13 Claims**

1. A method of rerefining used oil comprising contacting the used oil with at least one borohydride reducing agent.

4,504,384

TRITHIOCARBONATES AS ORE FLOTATION AGENTS

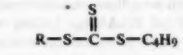
Robert M. Parlman, and James B. Kimble, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 194,325, Oct. 6, 1980, Pat. No. 4,341,715. This application Mar. 11, 1982, Ser. No. 357,117

Int. Cl.³ B03D *1/14*; C07C *154/00*

U.S. Cl. 209—166 **7 Claims**

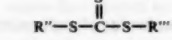
1. In an ore flotation process wherein a pulp comprising molybdenum ore and water is aerated to generate a mineral-containing froth and wherein said minerals are recovered from said froth, the improvement comprising incorporating into said pulp prior to said aeration a flotation agent comprising a trithiocarbonate having the formula



wherein R is an alkenyl radical having 2 to 12 carbon atoms.

3. A mineral recovery process comprising:

(a) mining crushed ore selected from the group consisting of copper ores, molybdenum ores and mixtures of any two or more thereof, water, and a trithiocarbonate having the formula



wherein R'' is a hydrocarbyl radical having 1 to 20 carbon atoms and R''', is an alkenyl radical having 2 to 12 carbon atoms to establish as pulp,

(b) aerating said pulp to produce a froth containing said minerals, and

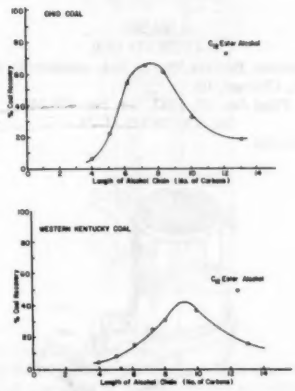
(c) recovering minerals from said froth.

4,504,385

ESTER-ALCOHOL FROTHERS FOR FROTH FLOTATION OF COAL

Robert O. Keys, Columbus, Ohio, assignor to Sherex Chemical Company, Inc., Dublin, Ohio

Filed Dec. 30, 1982, Ser. No. 454,607
Int. Cl.³ B03D 1/14
U.S. Cl. 209—166 **19 Claims**


OHIO COAL
% Coal Recovery
Length of Alcohol Chain (No. of Carbons)
WESTERN KENTUCKY COAL
% Coal Recovery
Length of Alcohol Chain (No. of Carbons)

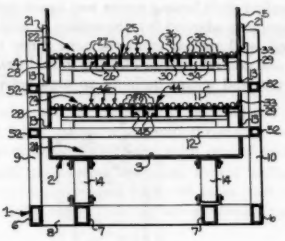
1. In a froth flotation process wherein solid coal particles are selectively separated under coal froth flotation conditions as a froth phase from remaining solid feed particles as an aqueous phase in the presence of a coal particle collector and an alcohol frother, the improvement characterized by said alcohol frother comprising a polyhydroxy frothing alcohol which has been modified to contain a carboxylic acid ester linkage where the carboxylic acid moeity contains between about 1 and 7 carbon atoms, said polyhydroxy frothing alcohol selected from the group consisting of a diol, a triol, a mixture of a diol and a monool wherein a dicarboxylic acid is used to modify said mixture, a polyoxyethylene glycol, a polyoxypropylene glycol, and mixtures thereof, the resulting ester-alcohol frothing agent having at least one hydroxyl group residual from said polyhydroxy frothing alcohol and providing greater coal recovery than use of said polyhydroxy frothing alcohol as the frothing agent.

4,504,386

SCREENING APPARATUS FOR WOOD CHIPS

Karl E. A. Dyrén, and Gustaf S. Strandberg, both of Örnsköldsvik, Sweden, assignors to KMW Aktiebolag, Karlstad, Sweden

Filed May 14, 1984, Ser. No. 609,743
Claims priority, application Sweden, May 16, 1983, 8302742
Int. Cl.³ B07B 1/30
U.S. Cl. 209—254 **17 Claims**



1. A screening apparatus for separating a particulate material, such as wood chips, according to thickness, and comprising

a frame,

deck means supported by said frame so as to permit relative movement therebetween, said deck means including at least one deck defining a material receiving end and a longitudinally separated material discharge end,

at least one screening section disposed along said one deck and comprising

(a) an opening in said deck

(b) a stationary grid fixedly mounted to said frame and disposed within said opening, said stationary grid comprising a plurality of elongate, parallel rod elements which extend in the longitudinal direction and are laterally spaced apart a uniform distance, and

(c) a movable grid fixedly mounted to said deck, said movable grid comprising a plurality of elongate parallel rod elements which extend parallel to the rod elements of said stationary grid, and with the rod elements of said movable grid alternating between the rod elements of said stationary grid so as to form substantially uniform and uninterrupted gaps between all adjacent pairs of rod elements,

drive means operatively interconnecting said frame and said deck means for imparting reciprocal movement to said deck means, with said reciprocal movement including vertical and longitudinal components so as to be adapted to toss the material deposited at said material receiving end longitudinally along said screening section and toward said discharge end,

whereby the portion of the particulate material being screened having a thickness less than the dimension of said gaps will fall between the rod elements, and the portion having a greater thickness will move longitudinally to said discharge end.

4,504,387

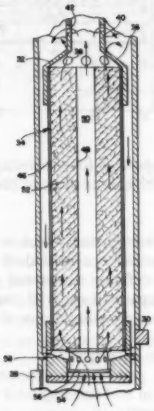
SYSTEM AND METHOD FOR WATER PURIFICATION

George J. LeMire, 57 South St., Plainville, Mass. 02762; Charles F. Heinig, Jr., 665 Main Ave., Warwick, R.I. 02886, and Edward A. LeMire, 159 Jordan Ave., Cranston, R.I. 02910

Filed Oct. 31, 1983, Ser. No. 547,128
Int. Cl.³ B01D 25/30, 33/38
U.S. Cl. 210—101 **3 Claims**

1. A water purification system for effectively eliminating bacteria in the water of a swimming pool including a water recycling system including a pump wherein a quantity of water

from said pool is continually withdrawn and returned thereto via suitable water conduits, comprising a canister having a hollow body including water inlet and outlet means provided thereon, said body in part forming first and second separate water channels therein, said first channel permitting water to move in an essentially unrestricted flow from said inlet to said outlet, said second channel having silver ion treated granules provided therein whereby water passing through said second channel is filtered by said granules and treated by said silver ions, said body being an elongated tube, a hollow elongated double-walled shell having upper and lower ends in a central interior opening adapted for disposition in said tube with the outer shell wall spaced from the tube inner surface, means defining said central interior opening in said shell forming said first channel and means defining an area between said shell



walls forming said second channel, and means defining the space between the outer shell and said tube forming a mixing chamber for admixing said filtered and treated water passing through said second channel with the untreated water passing through said first channel prior to exiting said canister via said outlet means, said inlet means adapted to direct incoming water into the lower end of said shell such that said water enters and its flow proportioned into both of said channels, means connecting both said channels with said mixing chamber at the upper end of said shell, said connecting means including means defining first openings whereby said untreated water passes into said mixing chamber and means defining separate second openings whereby said treated water passes into said mixing chamber, said first openings disposed above said second openings and said outlet means connected to said mixing chamber below both said first and second openings.

4,504,388

REACTOR FOR INJECTION OF GAS INTO A LIQUID

Gilbert Desbos, Paris, and Michel Faivre, Chelles, both of France, assignors to OTV (Omnium de Traitement et de Valorisation), Courbevoie, France

Filed Jun. 13, 1983, Ser. No. 503,902

Claims priority, application France, Jun. 14, 1982, 82 10290

Int. Cl.³ E02C 1//12

U.S. Cl. 210—150 **8 Claims**

1. An apparatus for the injection of gaseous fluids into a liquid mass, comprising:

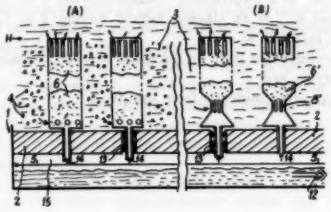
a reactor means for containing a liquid, said reactor means having a bottom wall;

a plurality of nozzles disposed on the bottom wall of said reactor means, each said nozzle comprising

a pipe portion extending from a level substantially even with the level of said bottom wall to a height a predetermined distance above said bottom wall, the top of said pipe portion being closed;

a tube portion connected to the bottom of said pipe portion and extending through the bottom wall of said reactor, the diameter of said tube portion being substantially smaller than the diameter of said pipe portion at the bottom thereof, the bottom of said pipe portion being closed except for said tube portion;

wherein said pipe portion includes a plurality of perforations



near the bottom thereof, whereby gaseous fluid passing through said tube portion into said pipe portion causes liquid in said reactor means to be sucked through said perforations, thereby breaking up the homogeneity of said gaseous fluid and wherein said pipe portion further includes a plurality of slots near the top thereof, whereby liquid and gas bubbles pass through said slots at the predetermined desired height of gaseous fluid introduction; and

gaseous fluid introduction means for supplying gaseous fluid to the lower end of said tube portions.

4,504,389

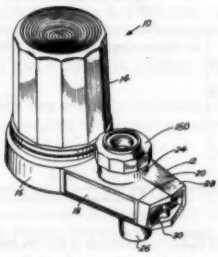
WATER FILTER

Alfons Rundzaitis, Beverly Shores, Ind., assignor to Associated Mills, Inc., Chicago, Ill.

Filed Jan. 17, 1983, Ser. No. 458,448

Int. Cl.³ B01D 23/26

U.S. Cl. 210—266 **9 Claims**



1. An improved water purification apparatus comprising, in combination:

a filter housing having a base and a cap removably secured to said base, said cap and said base cooperatively defining a filter chamber, said base having a water input channel and a water output channel, said water input channel and water output channel communicating with a first end in said filter chamber;

a cartridge filter removably disposed within said filter chamber, said cartridge filter providing means for receiving water from the water input channel, filtering the water, and returning the water to the water output channel, said receiving, filtering, and returning means including opposed first and second ends on the cartridge filter, a filtration material disposed between said first and second ends,

said filtration material having a first stage, a second stage, a third stage, and a fourth stage, said first, second, and fourth stages comprising ultrahigh molecular weight polymer, said third stage comprising activated carbon granules, and said first stage having greater porosity than said second stage;

a water-flow-control section projecting from the base, said water-flow-control section having a water inlet coupling attachable to a water source, a bore in communication with said water input channel, a filter bypass passage, an inlet port providing means for water communication between said water inlet coupling and said bore, and an outlet port providing means for water communication between said bore and said filter bypass passage;

a linearly slidable plunger penetrating the bore;

a water switch providing means for controllably sliding said plunger within said bore whereby water entering the bore from the inlet port can be selectively directed toward either the outlet port or the water input channel.

4,504,390

SELECTABLE FILTER ASSEMBLY

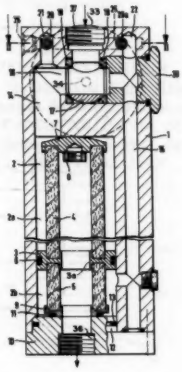
Peter Steffen, Kirchenstrasse 80, 6632 Saarwellingen, Fed. Rep. of Germany

Filed Jul. 19, 1983, Ser. No. 515,099

Claims priority, application Fed. Rep. of Germany, Jul. 20, 1982, 3227059

Int. Cl.³ B01D *35/12*

U.S. Cl. 210—333.1 **3 Claims**



1. A filter assembly comprising

a housing having a filter chamber, an inlet connectable to a source of raw fluid to be filtered and an outlet for dirty liquid;

first and second filter elements coaxially mounted in said chamber, each of said filter elements having first and second sides;

a mounting wall extending across said chamber between the adjacent proximal ends of said filter elements, said wall having an opening to permit communication between first sides of said elements and a solid portion to isolate the second sides of said elements from each other;

a filter cap closing the distal end of said first filter element;

a cover closing the end of said chamber adjacent the distal end of said second filter element, said cover having a clean fluid outlet connectable to a utilization device;

a first channel in said housing;

a three-way valve mounted in said first channel and connected to said inlet, said three-way valve including a rotatable valve member and first and second sealing rings on opposite sides of said valve member;

a support shoulder formed in said first channel abutting one of said sealing rings;

a hollow screw engaging the other of said sealing rings;

second and third channels in said housing, said second channel extending between one end of said first channel and the portion of said chamber on one side of said mounting wall and said third channel extending between the other end of said first channel and the portion of said chamber on the other side of said mounting wall;

second and third valves connected to said dirty fluid outlet and to opposite sides, respectively, of said three-way valve, each of said second and third valves having a valve seat, a valve member and a stem attached to the valve member; and

mechanical operation means connected for moving said three-way valve and for individually opening one of said second and third valves when said three-way valve is moved to interconnect said inlet with one of said filter elements, said mechanical operation means including a control plate coupled to said rotatable valve member and having an axially facing cam surface positioned to move said stems.

4,504,391

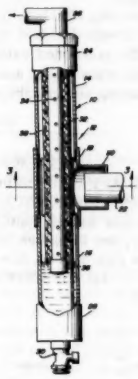
WATER WELL SAND SEPARATOR

Kelly G. Weems, Sr., 6700 Bayou Pines Dr., Biloxi, Miss. 39532

Filed Mar. 28, 1983, Ser. No. 479,804

Int. Cl.³ B01D *35/02*

U.S. Cl. 210—307 **8 Claims**



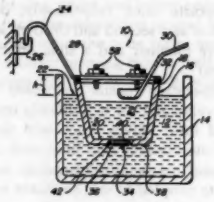
1. A water well sand separator including an upstanding hollow casing having an upper end water oulet and a lower end sand water outlet, said casing including a laterally outwardly opening water inlet centrally intermediate its opposite ends, a central outstanding tube disposed in said casing, said tube being capped at its lower end and mounted in sealed communication with said upper end water outlet at its upper end, said central tube including circumstantially and longitudinally spaced apertures formed therein intermediate the capped lower end and said water outlet, a thick-walled tubular body disposed about said apertured tube, said tubular body being constructed of porous filter material, an armor sleeve supported from and disposed partially about that portion, only, of said tubular body registered with said water inlet and spaced appreciably from the opposite ends of said tubular body, the lower end sand and water outlet including valve means for selectively opening and closing said sand and water outlet, said tubular body being fitted tightly about the apertured portions of said central tube.

4,504,392

APPARATUS FOR FILTRATION OF MOLTEN METAL

Daniel E. Groteke, 8 E. Lakeview Dr., Apt. #4, Cincinnati, Ohio 45237

Continuation-in-part of Ser. No. 256,829, Apr. 23, 1981, Pat. No. 4,394,271. This application Apr. 14, 1982, Ser. No. 368,108
The portion of the term of this patent subsequent to Jul. 19, 2000, has been disclaimed.
Int. Cl.[3] B01D 23/00; C22B 9/02
U.S. Cl. 210—471 22 Claims



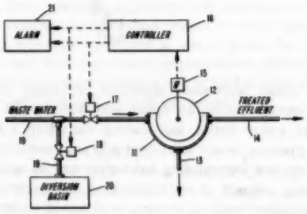
1. A liquid metal filter apparatus for purifying a metal bath, comprising:
a filtering vessel having a rim, sidewalls, and a bottom, said bottom having a hole therethrough;
said hole in said bottom of said filtering vessel having a wall, wherein said wall of the hole is substantially vertical;
a filter element of a porous ceramic material having an open cell structure characterized by a plurality of interconnected pores, said filter element being cemented to said wall of the hole;
a shock resistant ring attached to said rim;
a brace rigidly attached to said ring; and
a bracket rigidly positioned external to the molten metal bath and said brace being attached to said bracket for rigidly positioning said crucible with respect to the molten metal bath.

4,504,393

METHOD AND APPARATUS FOR CONTROLLING A ROTATING BIOLOGICAL CONTACTOR

Bryan T. Davies, San Rafael, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Jun. 8, 1984, Ser. No. 618,549
Int. Cl.[3] C02F 3/06
U.S. Cl. 210—614 18 Claims



1. A method of controlling a rotating biological contactor which includes at least one rotating member having a biomass of biological slime, said method comprising:
(a) passing waste water to the rotating biological contactor thereby establishing a normal weight of the biomass on said at least one rotating member;
(b) monitoring the weight of the biomass on said at least one rotating member; and
(c) in response to a rate of weight loss greater than a predetermined rate, controlling the passage of the waste water to the rotating biological contactor.

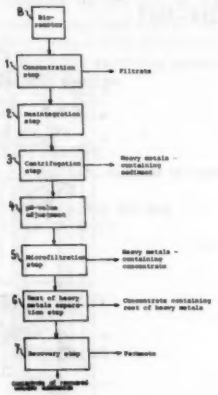
8. An apparatus for controlling a rotating biological contactor comprising:
(a) a vessel having a liquid inlet for waste water and a liquid outlet;
(b) liquid flow control means connected to the liquid inlet;
(c) at least one rotating member having a biomass of biological slime thereon located in the vessel and connected to a rotating shaft;
(d) means for sensing the weight of the biomass; and
(e) controller means operably connected to the weight sensing means and the liquid flow control means wherein upon the occurrence of a rate of decrease of the weight of the biomass greater than a predetermined rate, the flow of the waste water to the vessel is controlled.

4,504,394

PROCESS FOR THE TREATMENT OF ORGANIC FALL-OUT PRODUCTS

Hans Breuer, Biel; Frank Rindelaub, Areuse, both of Switzerland, and Gerhard Velebil, Schliengen, Fed. Rep. of Germany, assignors to BRV Technologie-Systeme AG, Areuse, Switzerland

Filed Aug. 24, 1983, Ser. No. 525,949
Claims priority, application European Pat. Off., Sep. 3, 1982, 82810367.1
Int. Cl.[3] C02F 1/38
U.S. Cl. 210—632 8 Claims



1. A process for treating a heavy metal contaminated preconcentrated biomass for separating heavy metal contaminants therefrom, which comprises:
removing water from preconcentrated biomass material to form a concentrate;
disintegrating the concentrate to disrupt the cell structure of the organic material contained therein, thereby laying bare both valuable and recoverable organic substances contained within the cell structure and heavy metal contaminants;
centrifuging the disintegrated concentrate to recover a sediment portion and a liquid portion, said sediment portion containing a preponderant part of the heavy metal contaminants contained originally in the disintegrated concentrate;
adjusting the PH of the liquid portion recovered in the centrifugation step to a level suitable for additional heavy metal contaminant separation;
microfiltering the PH-adjusted liquid portion to separate therefrom an additional portion of the heavy metal contaminants;
treating the liquid effluent from the microfiltration step to

facilitate a still further separation of heavy metal contaminants; and

separating the treated liquid effluent into a concentrate containing substantially all of the remaining heavy metal contaminants and an aqueous solution consisting essentially of amino acids, non-noxious mineral salts and soluble organic matter.

4,504,395

PAINT SPRAY BOOTH DETACKIFICATION COMPOSITION AND METHOD

William L. Harpel, Langhorne, and Richard J. Pilny, Warrington, both of Pa., assignors to Betz Laboratories, Inc., Trevose, Pa.

Filed Feb. 7, 1984, Ser. No. 577,905
Int. Cl.³ C02F *1/56*
U.S. Cl. 210—712 **4 Claims**

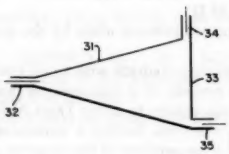
1. A process for controlling pollution and contamination in paint, lacquer or enamel spray booths in which water is used to wash air in said booth and to remove over-sprayed paints, enamels or lacquers, said water being recirculated for further use in washing the air in said spray booths, said process comprising adding to said water an effective amount for the purpose of a detackifying composition consisting essentially of a hectorite clay having the empirical formula $[Mg_{2.67}Li_{0.33}(Na_{0.33})]Si_4O_{10}(OH,F)_2$, said amount being sufficient to reduce the tackiness of said paints, enamels and lacquers and to thereby reduce the tendency of oversprayed paints, enamels and lacquers to adhere to pump parts, mist eliminators, or sump sidewalls of said spray booths, said composition being effective to condition paint, enamel and lacquer solids so as to facilitate removal of said solids from said water.

4,504,396

PURIFICATION SYSTEM

Isaih Vardi, 20 Hess St., Rehovot; Yigal Kimchi, 7 Zvi St., Ramat Gan, and Jonathan Ben-Dror, Hadar Am, all of Israel

Continuation-in-part of Ser. No. 150,046, May 15, 1980, abandoned. This application Mar. 15, 1982, Ser. No. 358,283
Int. Cl.³ B01D *17/02, 19/00*
U.S. Cl. 210– 800 **5 Claims**



1. A method for separating at least one of non-condensable gases and immiscible liquids from an aqueous refrigerant in a horizontal vessel comprising the steps of:

(a) feeding a stream of aqueous refrigerant containing at least one of non-condensable gases and an immiscible liquid to an inlet of a vessel, the specific gravity of the aqueous refrigerant being greater than the specific gravity of the at least one non-condensable gases and immiscible liquid, said vessel comprising a shell of increasing cross-sectional area along a horizontal axis, said shell is one of a conical and a polyhedral shape, the walls of said shell along said axis being outwardly divergent at an angle of between about 6° to 10°, defining a small convergent inlet end and a large divergent closed outlet end, an inlet means at the small convergent end, an upper outlet means at the upper portion of the divergent end, and a lower outlet means at a lower portion of the divergent end;

(b) flowing the aqueous refrigerant through the vessel in substantially unobstructed laminar flow;

(c) separating the aqueous refrigerant from at least one of the condensable gases and immiscible liquid by gravity-type separation;

(d) removing at least one of the non-condensable gases and immiscible liquid from the vessel through the upper outlet means; and

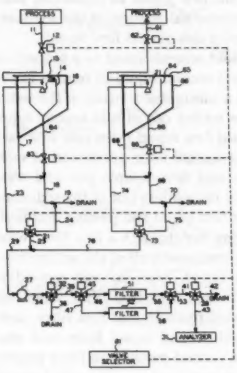
(e) removing the aqueous refrigerant through the lower outlet means.

4,504,397

REMOVAL OF SEDIMENTARY CONSTITUENTS FROM LIQUIDS

William E. Matthews, Old Ocean, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sep. 30, 1982, Ser. No. 430,632
Int. Cl.³ B01D *21/02*
U.S. Cl. 210—804 **16 Claims**



5. Apparatus comprising:

a first sample pot;

means for providing a first liquid containing sedimentary constituents to said first sample pot, wherein said first liquid is allowed to remain in said first sample pot until a substantial portion of the sedimentary constituents have settled out of said first liquid;

a second sample pot;

means for providing a second liquid containing sedimentary constituents to said second sample pot, wherein said second liquid is allowed to remain in said second sample pot until a substantial portion of the sedimentary constituents have settled out of said second liquid;

a first particulate filter positioned in said first liquid contained in said first sample pot and above the sediment formed by the settling out of the sedimentary constituents from said first liquid;

a pumping means;

a first control valve operably located so as to control the flow of said first liquid from said first particulate filter to said pumping means;

a second particulate filter positioned in said second liquid contained in said second sample pot and above the level of the sediment formed by the settling out of the sedimentary constituents from said second liquid;

a second control valve operably located so as to control the flow of said second liquid from said second particulate filter to the suction inlet of said pumping means;

a first filter; and

means for passing liquid from the discharge outlet of said pumping means through said first filter, wherein said first control valve is actuated so as to allow said first liquid to be pumped from said first sample pot when it is desired to pass said first liquid through said first filter and said second control valve is actuated so as to prevent the flow of said second liquid from said second sample pot to said first

filter when it is desired to pass said first liquid through said first filter, wherein said second control valve is actuated so as to allow said second liquid to be pumped from said second sample pot through said first filter when it is desired to pass said second liquid through said first filter and said first control valve is actuated so as to prevent the flow of said first liquid from said first sample pot through said first filter when it is desired to pass said second liquid through said first filter, and wherein the sedimentary constituents in said first liquid and said second liquid are substantially removed from said first liquid and said second liquid after said first liquid and said second liquid pass through said first filter.

13. A method for removing sedimentary constituents from first and second liquids comprising the steps of:

providing said first liquid to a first sample pot;

allowing said first liquid to remain in said first sample pot until a substantial portion of the sedimentary constituents have settled out of said first liquid;

providing said second liquid to a second sample pot;

allowing said second liquid to remain in said second sample pot until a substantial portion of the sedimentary constituents have settled out of said second liquid;

pumping said first liquid from said first sample pot through a first particulate filter positioned in said first liquid contained in said first sample pot and above the sediment formed by the settling out of the sedimentary constituents from said first liquid and passing said first liquid from said first settling pot through a first filter when it is desired to remove substantially all of the sedimentary constituents in said first liquid, wherein said second liquid cannot be passed through said first filter when said first liquid is being passed through said first filter; and

pumping said second liquid from said second sample pot through a second particulate filter positioned in said second liquid contained in said second sample pot but above the sediment formed by the settling out of the sedimentary constituents from said second liquid and passing the second liquid from said second settling pot through a second filter when it is desired to remove substantially all of the sedimentary constituents in said second liquid, wherein said first liquid cannot be passed through said first filter when said second liquid is being passed through said first filter.

4,504,398

PROCESS FOR AUGMENTING OR ENHANCING THE AROMA OF PERFUMED ARTICLES BY ADDING THERETO TRICONJUGATED DIENONES

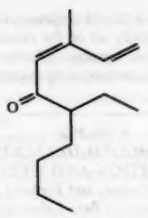
William J. Evers, Locust; Gilbert Stork, Englewood; Braja D. Mookherjee, Holmdel, and Howard H. Heinsohn, Jr., Freehold, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 431,268, Sep. 30, 1982, Pat. No. 4,451,392. This application Nov. 14, 1983, Ser. No. 551,482

Int. Cl.[3] **C11D** *3/50*; **D06M** *13/20*

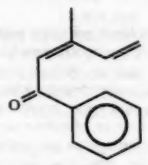
U.S. Cl. 252—8.6 **2 Claims**

1. A process for augmenting or enhancing the aroma of a solid or liquid anionic, cationic, nonionic or zwitterionic detergent comprising the step of intimately admixing with said solid or liquid anionic cationic, nonionic or zwitterionic detergent an aroma augmenting or enhancing quantity of at least one compound having a structure selected from the group consisting of:



(i)

and



(ii)

4,504,399

SURFACTANT AND PROCESS FOR ENHANCED OIL RECOVERY

Paul R. Stapp, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sep. 15, 1983, Ser. No. 532,434

Int. Cl.[3] **E21B** *43/22*

U.S. Cl. 252—8.55 D **14 Claims**

1. A surfactant composition made by the process comprising:

(a) reacting maleic anhydride with an oil containing at least five weight percent of at least one polynuclear aromatic compound susceptible to either Diels-Alder reactions or to ene-type reactions, having a molecular weight of at least 155, at a temperature in the range of about 50°-250° C. for about 1 hour to 21 days to form a dicarboxylic anhydride reaction adduct; and

(b) thereafter neutralizing said reaction adduct with a neutralizing agent to a pH in the range of 7–13.

9. In a process for the recovery of oil from a subterranean formation which comprises injecting a surfactant system into the formation via one or more injection wells, the improvement which comprises utilizing a surfactant system consisting essentially of:

(a) 60–99.8 parts by weight of water;

(b) 0.1–15 parts by weight of sodium chloride;

(c) 0.1–25 parts by weight of a surfactant composition made by the process comprising:

(a) reacting maleic anhydride with an oil containing at least five weight percent of at least one polynuclear aromatic compound susceptible to either Diels-Alder reactions or to ene-type reactions, having a molecular weight of at least 155, at a temperature in the range of 50°–250° C. for about 1 hour to 21 days to form a dicarboxylic anhydride reaction adduct; and

(b) thereafter neutralizing said reaction adduct with a neutralizing agent to a pH in the range of 7–13.

4,504,400

FLUID AND METHOD FOR PLACING GRAVEL PACKS

Ralph O. Willard, Tulsa, Okla., assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 308,078, Oct. 2, 1981, abandoned, which is a continuation of Ser. No. 128,682, Mar. 10, 1980, abandoned. This application Jan. 9, 1984, Ser. No. 569,100

Int. Cl.³ E21B *43/04*

U.S. Cl. 252—8.55 R **17 Claims**

1. A gelled, aqueous composition capable of transporting particulate solids as a slurry and capable of stabilizing clays and fines in a formation containing same, which composition comprises:

(A) water;

(B) a hydroxyalkylcellulose; and

(C) an acidic breaker consisting essentially of either fluoboric acid or a mixture of fluoboric acid and hydrochloric acid, wherein the concentration of fluoboric acid is about 1 to about 48 percent of the combined weight of Components A and B.

4,504,401

STAINPROOFING AGENT AND PROCESS FOR ITS PREPARATION

Masashi Matsuo; Katsuji Itoh, both of Yokohama; Takao Hayashi, Zushi, and Yoshio Oda, Yokohama, all of Japan, assignors to Asahi Glass Company Ltd., Tokyo, Japan

Filed Aug. 8, 1983, Ser. No. 521,407

Claims priority, application Japan, Aug. 20, 1982, 57-143463

Int. Cl.³ D06M *13/28, 13/40*

U.S. Cl. 252—8.75 **7 Claims**

1. A stainproofing agent containing as an active ingredient a polyfluoroalkyl-containing compound of the following formula and having a molecular weight of from 800 to 3000:

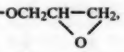
$$(R_f\text{—}X\text{—}A\text{—}CONH)_a\text{—}W\text{—}(NHCO\text{—}A'\text{—}Z)_{3-a} \quad (I)$$

wherein

R_f is a polyfluoroalkyl group having from 1 to 20 carbon atoms,

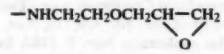
X is —R—, —CON(R^1)—Q— or —SO_2N(R^1)—Q—, wherein R is alkylene, R^1 is a hydrogen atom or a lower alkyl group and Q is alkylene,

—A′—Z is selected from the group consisting of



—OR′, —OCH_2CH_2CN, —$OCH_2CH_2NO_2$, —OCH_2CH_2OH, —$NHCH_2OH$, —$NHCH_2CH_2OH$,

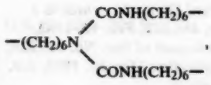
—NHR′, —NR′R′, —$N(CH_2CH_2OH)_2$ and

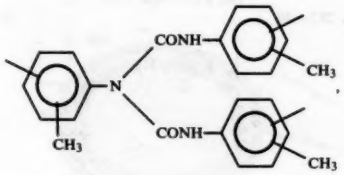


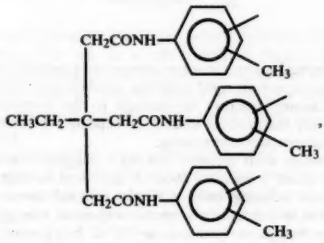
wherein R′ is an alkyl group,

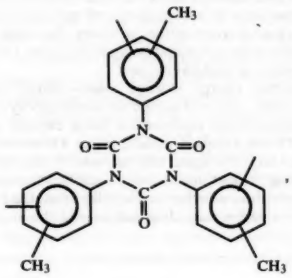
A is —O—, —S— or —N(Z′)— wherein Z′ is H or lower alkyl,

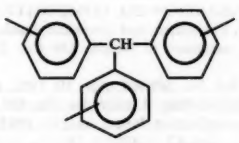
W is selected from the group consisting of



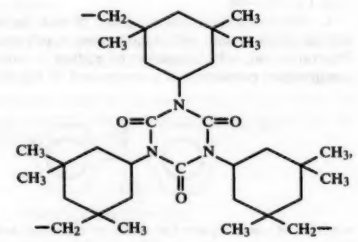








and



and a is an integer of 1, 2 or 3.

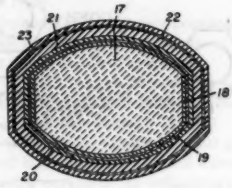
4,504,402
ENCAPSULATED PHASE CHANGE THERMAL ENERGY STORAGE MATERIALS

Johnson C. H. Chen, and John L. Eichelberger, both of King of Prussia, Pa., assignors to Pennwalt Corporation, Philadelphia, Pa.

Division of Ser. No. 504,029, Jun. 13, 1983, , which is a continuation-in-part of Ser. No. 466,802, Feb. 16, 1983, abandoned, which is a continuation-in-part of Ser. No. 145,228, Apr. 30, 1980, abandoned. This application May 14, 1984, Ser. No. 609,665

Int. Cl.³ C09K *3/18*

U.S. Cl. 252—70 **12 Claims**



1. A thermal energy storage composite product capable of incorporation within rigid building construction components without causing fracture or damage to the components or product after the product undergoes repeated thermal change cycles, said product comprising:

(a) an outer shell member having a longest dimension of from about ¼ inch to about 1 inch and having interior surfaces defining only a single internal cavity that is adapted to permanently encase a thermal energy storage phase-change composition, said shell being comprised of at least one seamless layer of a wall-forming material that is substantially impermeable to and non-reactive with said phase-change composition or water, the total volume of the wall-forming material being from about 5% to 30% of the volume of said cavity; and

(b) a thermal energy storage phase-change composition permanently disposed within the single cavity of the shell, said phase-change composition being capable of exisiting in solid form, a melted liquid form, or a transition state that includes both the liquid and the solid forms, the composition being present in a quantity such that the total volume of composition whether in the solid form, the liquid form, or the transition state does not exceed the volume of the cavity.

4,504,403
REFRIGERATION OIL COMPOSITION

Masaaki Tsunemi, Yokohama, and Umekichi Sasaki, Kawasaki, both of Japan, assignors to Nippon Oil Co., Ltd., Tokyo, Japan

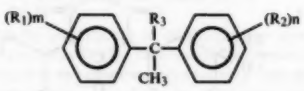
Continuation of Ser. No. 369,901, Apr. 19, 1982, abandoned. This application May 3, 1984, Ser. No. 606,854

Claims priority, application Japan, Apr. 23, 1981, 56-61655

Int. Cl.³ C10M *1/16*

U.S. Cl. 252—68 **1 Claim**

1. The method of lowering the power requirements of a refrigeration system which comprises a refrigerant and a refrigeration oil, which consists of adding to said refrigerant a composition consisting of a compound of the formula:



wherein R_1 and R_2 are the same or different and each are an alkyl group of 1 to 5 carbon atoms; R_3 is hydrogen or an alkyl group of 1 to 5 carbon atoms; m and n are the same or different and each are 0 or an integer of 1 to 5, said compound having a dynamic viscosity of 5 to 20 cSt at 40° C. and at least one additive which is a member selected from the group consisting of:

(a) a hydrocholoric acid capturing agent, which is a member selected from the group consisting of glycidylether epoxy compounds, epoxized aliphatic acid monoesters, epoxized vegetable oils and tri-substituted-phosphorous acid esters;

(b) a wear inhibitor, which is a tri-substituted-phosphoric acid ester;

(c) an oxidation inhibitor, which is an alkylphenol or an aromatic amine or a mixture thereof; and

(d) a defoaming agent which is a dimethyl silicone oil in an amount of 1 ppm to 10.0 percent by weight based on the total amount of the composition.

4,504,404
LUBRICANT COMPOSITIONS CONTAINING CHLORINATED ORGANIC COMPOUNDS

Rolf Schumacher, Pfeffingen, and Arnold Grubenmann, Binningen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 406,669, Aug. 9, 1982, abandoned. This application Jul. 16, 1984, Ser. No. 631,510

Claims priority, application Switzerland, Aug. 20, 1981, 5382/81

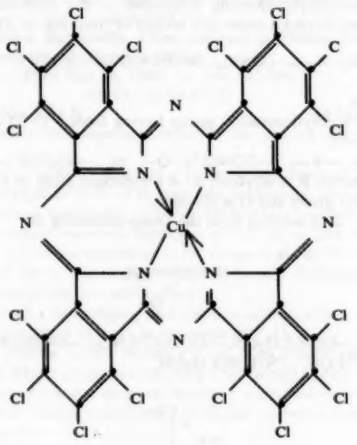
Int. Cl.³ C10M *1/54*

U.S. Cl. 252—33.4 **8 Claims**

1. A liquid lubricant composition, having a kinematic viscosity of 2–1500 mm^2/s at 40° C., which comprises

(a) a luoricant , and

(b) 0.01 to 4.5% by weight, based on the lubricant, of an extreme pressure additive which is a compound of the formula



4,504,405
METHOD OF CLEANING SOFT CONTACT LENSES

John G. B. Howes, Hertford Heath, England, assignor to Smith and Nephew Associated Companies p.l.c., England

Continuation-in-part of Ser. No. 320,710, Nov. 11, 1981, Pat. No. 4,438,011. This application Nov. 8, 1982, Ser. No. 439,780

Claims priority, application United Kingdom, Dec. 18, 1980, 8040532; Nov. 6, 1981, 8133621; Nov. 28, 1981, 8135621

Int. Cl.³ C11D *3/48, 1/835*

U.S. Cl. 252—106 **13 Claims**

1. A method of cleaning a soft contact lens which method

comprises placing a cleaning solution in a suitable container, immersing the lens in the solution, closing the container, shaking together the lens and the solution, removing the lens and rinsing it with saline solution, said cleaning solution comprising a substantially isotonic aqueous solution having little or no propensity to cause ocular irritation said solution comprising a sterile aqueous solution of 0.01 to 20% of an ophthalmically acceptable non-ionic surface active agent, 0.0012 to 0.003% of a chlorhexidine salt selected from the gluconate or acetate salts, and a sufficient amount of tonicity adjusting agent to render the solution substantially isotonic, said tonicity and adjusting agent containing ionic species producing a tonicity equivalent to not more than 0.3% solution of sodium chloride, said non-ionic tonicity agent is selected from the group consisting of propylene glycol, glycerol, glucose, lactose, mannitol and urea.

4,504,406

CLEANSING AGENT FOR PRINTING PLATES

Major S. Dhillon, Hillsborough, N.J., assignor to American Hoechst Corporation, Somerville, N.J.

Filed Feb. 22, 1983, Ser. No. 468,253
Int. Cl.³ C09K *3/00*; C11D *1/66, 3/02, 3/18*
U.S. Cl. 252—143 **18 Claims**

1. A cleaner suitable for use as a cleansing agent for lithographic printing plates which comprises a stable emulsion of

(a) a composition of hydrocarbons having a boiling point in the range of from about 200° F. to about 500° F., and a flash point of above about 100° F., said composition containing less than about 10% aromatic components; and

(b) a composition comprising one or more non-ionic surfactants which composition has a hydrophile-lipophile balance of from about 3 to about 10; and

(c) at least one electrolyte comprising an ammonium, alkali metal, or alkali metal silicate, sulfate, phosphate or nitrate; and

(d) water; and

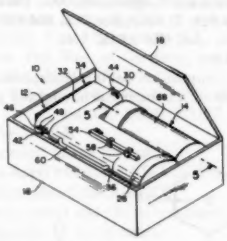
(e) an organic or inorganic acid.

4,504,407

DRY SPOT REMOVER COMPOSITION AND CONTAINER COMPRISING WHITE TALC AND EUCALYPTUS OIL

Nathaniel Klutz, Jr., c/o George Spector, 3615 Woolworth Bldg., 233 Broadway, and George Spector, 3615 Woolworth Bldg., 233 Broadway, both of New York, N.Y. 10007

Filed Aug. 26, 1983, Ser. No. 526,785
Int. Cl.³ C11D *7/60*; B08B *1/00*; B65D *25/08*
U.S. Cl. 252—162 **2 Claims**



1. A dry powder spot remover composition comprising:

(a) 2 pounds of light white talc (steatite); and

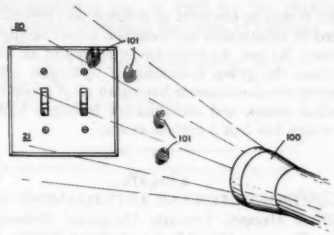
(b) 1 ounce of eucalyptus oil.

4,504,408

FLUORESCENT VAPOR FUMES FOR USE WITH A SELF-CONTAINED FINGERPRINTING KIT

William P. Morton, 11260 Missouri Ave., Los Angeles, Calif. 90025

Filed Sep. 23, 1983, Ser. No. 535,023
Int. Cl.³ C09K *11/06*
U.S. Cl. 252—301.16 **6 Claims**



1. A vapor phase activator pad which produces fluorescent vapor fumes for use in a self-contained fingerprinting kit wherein said vapor phase activator pad is placed into an enclosed area order to fume an object in the area suspected of containing latent fingerprints, said vapor phase activator pad comprising:

a. a fluorescent dye impregnated gauze pad;

b. a composition which consists of a first component which is a mixture of two selective chemicals, chlorothane in the range of 1 to 96 percent and stabilized with methanol in the range of 1 to 10 percent and a second component which is a mixture of four selective chemicals, nitroethane and nitromethane in the range of 1 to 5 percent and stabilized with toluene in the range of 1 to 4 percent, said second component also includes an activator which is diethylenetriamine in the range of 1 to 9 percent wherein said composition provides a controlled oxidative vaporization of said quantity of alkyl-cyanoacrylate whereby said fluorescent dye impregated gauze pad is chemically treated with said composition so that when a quantity of alkyl-cyanoacrylate is placed onto said vapor phase activator pad, said vapor phase activator pad generates fluorescent vapors of the chemical cyanoacrylate wherein said latent fingerprints become exposed when an ultraviolet light source is shined on said object containing said latent fingerprints.

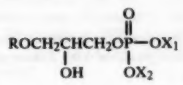
4,504,409

EMULSIFYING COMPOSITION

Hisao Tsutsumi, Miyashiro; Tomoko Inoue, Yokohama, and Atsuo Ishida, Chiba, all of Japan, assignors to Kao Corporation, Tokyo, Japan

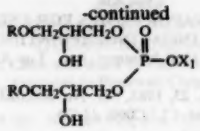
Filed Nov. 22, 1982, Ser. No. 443,611
Claims priority, application Japan, Dec. 16, 1981, 56-203189
Int. Cl.³ C11D *3/36*
U.S. Cl. 252—351 **12 Claims**

1. An emulsifying composition comprising one or more of alkyl or alkenyl glyceryl ether phosphates represented by the general formula (I) and/or (II)



(I)

-continued



(II)

in which R may be the same or different and represent a linear saturated or unsaturated hydrocarbon group having 8–20 carbon atoms, X_1 and X_2 indepdently represent an ion pair selected from the group consisting of hydrogen, alkali metal, ammonium, alkylammonium having an alkyl group containing 1–5 carbon atoms, and alkanolamine having a hydroxyalkyl group which has 2 or 3 carbon atoms.

4,504,410

ORGANOPOLYSILOXANE ANTI-FOAMING AGENTS

Hans-Ulrich Hempel, Overath; Margarete Grünert, Kaarst; Holger Tesmann, Düsseldorf, and Heinz Müller, Monheim, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft, Duesseldorf, Fed. Rep. of Germany

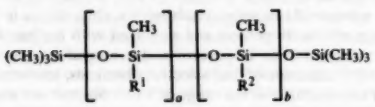
Filed Jun. 17, 1982, Ser. No. 389,261

Claims priority, application Fed. Rep. of Germany, Jan. 7, 1982, 3200206

Int. Cl.³ C09K *3/00*; B01D *17/00*

U.S. Cl. 252—358 **8 Claims**

4. A process for the manufacture of an organopolysiloxane of the formula



(I)

wherein

R^1=—$(CH_2)_c$—CH_3

R^2=—$(CH_2)_d$—$COO(CH_2—CHZ—O)_e$—R^3

R^3=a C_1-C_6 straight or branched chain alkyl group

Z=H or CH_3

a=a whole number from 28 to 36 inclusive

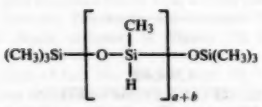
b=a whole number from 5 to 12 inclusive

c=a whole number from 5 to 9 inclusive

d=a whole number from 8 to 12 inclusive

e=a whole number from 1 to 24 inclusive, comprising the steps of

(a) reacting a methylpolysiloxane of Formula II



(II)

with an olefin of Formula III

$$CH_2=CH—(CH_2)_{c-2}—CH_3 \quad \text{(III)}$$

and an ester of a straight chain unsaturated carboxylic acid of Formula IV

$$CH_2=CH—(CH_2)_{d-2}—COOR^3 \quad \text{(IV)}$$

in the presence of a catalyst at a temperature above about 80° C.; and

(b) transesterifying the reaction product from step (a) by reacting said reaction product with a monoalkylated polyglycol of Formula V

$$HO—(CH_2—CHZ—O)_e—R^3 \quad \text{(V)}$$

wherein in the above reaction sequence, a, b, c, d, e, Z, and R^3 have the meanings given above.

4,504,411

RESISTOR COMPOSITION FOR RESISTOR-INCORPORATED SPARK PLUGS

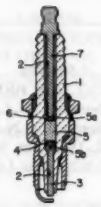
Masao Sakai, Kasugai; Yasuhiko Suzuki, Aichi, and Makoto Sugimoto, Nagoya, all of Japan, assignors to NGK Spark Plug Co., Ltd., Aichi, Japan

Filed Jul. 15, 1983, Ser. No. 514,327

Claims priority, application Japan, Jul. 21, 1982, 57-125732

Int. Cl.³ H01B *1/06*

U.S. Cl. 252—506 **7 Claims**



1. A resistor composition for a resistor-incorporated spark plug, adapted to be sealed in a centerbore of a ceramic insulator, comprising

100 parts by weight of a base mixture of 30–70% by weight of glass and the remainder being an inorganic aggregate comprising alumina, zircon, mullite, silica, fused silica, magnesia, clay, silicon nitride, aluminum nitrides, boron nitride or mixtures thereof;

0.1–10 parts per weight, calculated as carbon on calcination, of an organic carbonaceous material; and

0–30 parts by weight of an agent for stabilizing resistance under load consisting of one or more selected from the group consisting of oxides and rare earth elements and metals from subgroups IVa, Va and VIa of the periodic table, ZnO, B_4C, SiC, TiB and TiN,

wherein 1–100% by weight of said aggregate is mixed with the organic carbonaceous material and calcined prior to mixture with the glass and the remaining ingredients of the resistor composition to absorb the resultant carbonized carbon onto the calcined aggregate.

4,504,412

CYCLOHEXANE DERIVATIVES IN FRAGRANCE COMPOSITIONS

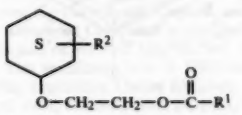
Eugene G. Harris, West Chester, Ohio, assignor to National Distillers and Chemical Corporation, New York, N.Y.

Filed Feb. 7, 1983, Ser. No. 464,533

Int. Cl.³ A61K *7/46*

U.S. Cl. 252—522 R **6 Claims**

1. A fragrance composition having incorporated therein an odoriferous amount of a compound having the general structural formula:



wherein R^1 is hydrogen or a lopwer alkyl having from 1 to about 10 carbons and R^2 is selected from the group consisiting

of hydrogen and lower alkyl having from 1 to about 4 carbon atoms providing a pleasing, strong and long lasting aroma.

4,504,413

SYNTHESIS OF THYMOSIN ALPHA$_1$ AND DESACETYL THYMOSIN ALPHA$_1$

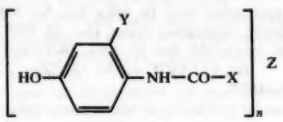
Pyare Khanna, San Jose, Calif., assignor to Syva Company, Palo Alto, Calif.

Division of Ser. No. 364,836, Apr. 2, 1982, Pat. No. 4,424,150. This application Nov. 17, 1983, Ser. No. 552,955

Int. Cl.^{3} C07C *101/44;* **A61K** *31/015*

U.S. Cl. 260—112 R **11 Claims**

1. A compound of the formula



wherein:

X is methyl or —R—(CO)$_m$

Y is —R^1—CO—NH—R^2(CO)$_m$ when X is methyl, and hydrogen when X is —R—(CO)$_m$

R, R^1, and R^2 are independently aliphatic linking groups of from 1 to 12 carbon atoms each;

Z is a poly(amino acid) residue which is an enzyme;

m is zero or one; and

n is an integer ranging from one to a value approximately equal to the molecular weight of Z divided by 500 when Z is a poly(amino acid), and is otherwise one.

4,504,414

SYNTHETIC PYRIDYL-ALANYL DECAPEPTIDES HAVING ANTIOVULATORY ACTIVITY

Karl Folkers, Austin, Tex.; Cyril Y. Bowers, New Orleans, La.; Teresa M. Kubiak, New York, N.Y., and Janusz Stepinski, Austin, Tex., assignors to Board of Regents, The University of Texas System, Austin, Tex.

Filed Mar. 28, 1983, Ser. No. 479,645

Int. Cl.^{3} C07C *103/52*

U.S. Cl. 260—112.5 LH **10 Claims**

1. [N-Ac-D-2-Nal^1,pCl-D-Phe^2,D-3-Pal^3,D-Arg^6,D-Ala^{10}]-LHRH.

4,504,415

SYNTHESIS OF THYMOSIN α_1 AND DESACETYL THYMOSIN α_1

Arthur M. Felix, West Caldwell, N.J.; Dieter Gillessen, Pratteln; Rolf Studer, Bottmingen, both of Switzerland; Johannes A. Meienhofer, Upper Montclair, N.J., and Arnold Trzeciak, Schopfheim, Fed. Rep. of Germany, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Apr. 4, 1983, Ser. No. 482,114

Int. Cl.^{3} C07C *103/52*

U.S. Cl. 260—112.5 R **5 Claims**

1. A compound of the formula

Ac-Ser(tBu)-Asp(OtBu)-Ala-Ala-Val-Asp(OtBu)-Thr(tBu)-Ser(tBu)-Ser(tBu)-Glu(OtBu)-OH

wherein Ac is acetyl and tBu is tert.butyl.

2. A compound of the formula

H-Ile-Thr(tBu)-Thr(tBu)-Lys(Boc)-Asp(OtBu)-Leu-Lys(-Boc)-Glu(OtBu)-Lys(Boc)-Lys(Boc)-Glu(OtBu)-Val-Val-Glu(OtBu)-Glu(OtBu)-Ala-Glu(OtBu)-Asn-OtBu

wherein tBu is tert.butyl and Boc is tert.butyloxycarbonyl.

4,504,416

AZO COMPOUNDS DERIVING FROM AMINO BENZOIC ACID ANILIDES AND ACETOACETYLAMINO-BENZIMIDAZOLONE

Klaus Hunger, and Manfred Pesenacker, both of Kelkheim, Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

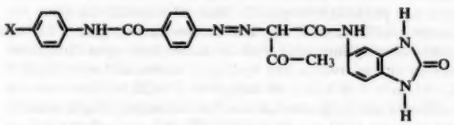
Division of Ser. No. 86,126, Oct. 18, 1979, Pat. No. 4,302,389. This application Apr. 21, 1981, Ser. No. 256,085

Claims priority, application Fed. Rep. of Germany, Oct. 21, 1978, 2845947

Int. Cl.^{3} C09B *29/01, 29/32, 29/33*

U.S. Cl. 534—742 **1 Claim**

1. A compound of the formula



wherein X is chloro.

4,504,417

15-DEOXY-16-HYDROXY-16-SUBSTITUTED PROSTANOIC ACIDS AND CONGENERS

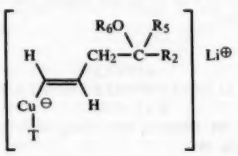
Middleton B. Floyd, Jr., Suffern, N.Y.; Martin J. Weiss, Oradell, N.J.; Charles V. Grudzinskas, Garnerville, N.Y., and Sow-Mei L. Chen, Park Ridge, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 305,901, Sep. 25, 1981, Pat. No. 4,429,148, which is a division of Ser. No. 79,126, Sep. 26, 1979, Pat. No. 4,328,358, which is a division of Ser. No. 835,614, Sep. 22, 1977, Pat. No. 4,192,950, which is a division of Ser. No. 706,343, Jul. 19, 1976, Pat. No. 4,061,670. This application Jan. 6, 1982, Ser. No. 337,425

Int. Cl.^{3} C07F *1/08*

U.S. Cl. 260—438.1 **6 Claims**

1. A compound of the formula:



wherein R_5 is selected from the group consisting of vinyl, methylvinyl and cyclopropyl; R_2 is an alkyl or alkenylmethyl group of three to seven carbon atoms optionally substituted with one or two alkyl groups of one to three carbon atoms; R_6 is a protecting group, and T is selected from the group consisting of thiophenoxide, an alkyne and the identical alkenyl moiety.

4,504,418

NON-IONIC SURFACE-ACTIVE AGENTS COUPLED WITH CARBONATES OR CARBOXYLIC ESTERS

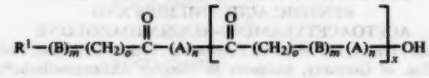
William K. Langdon, Grosse Ile, Mich., assignor to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Jan. 9, 1981, Ser. No. 223,877

Int. Cl.^{3} C07C *69/96, 69/34*

U.S. Cl. 260—463 **9 Claims**

1. A composition of matter having the formula



wherein R^1 is the residue of at least one hydrophobic C_{6-30} alkanol derived from a compound selected from the group consisting of an alkanol, an aromatic hydrocarbyl alkanol, alkoxylated esters of alkanols, and aromatic hydrocarbyl alkanols an alkoxylated aryl alcohol, and an alkoxylated alkyl aromatic hydrocarbyl alcohol wherein A is the residue of at least one hydrophilic oxyalkylene polymer derived from the same or different alkylene oxides wherein said polymer is selected from the group consisting of heteric, block and homopolymer polyalkylene glycols derived respectively from the reaction of at least 2 alkylene oxides having 2 to 4 carbon atoms or ethylene oxide with an active hydrogen compound having at least two active hydrogen atoms, and wherein B is C=O, m is 0 or 1, x is an integer of 1 to 20, n is individually selected from integers such that the molecular weight is about 104 to about 1000, o is an integer of 0 to 4, and when o is 0, m is 0.

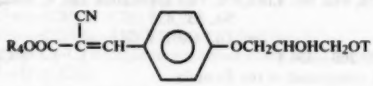
4,504,419

ALPHA-CYANOCINNAMATE ULTRAVIOLET-ABSORBING STABILIZERS SUBSTITUTED BY AN ALIPHATIC HYDROXYL GROUP

Martin Dexter, Briarcliff Manor, and Roland A. E. Winter, Armonk, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 318,648, Nov. 5, 1981, Pat. No. 4,414,393.
This application Sep. 30, 1982, Ser. No. 431,497
Int. Cl.³ C07C *121/50*
U.S. Cl. 260—465 D **2 Claims**

1. A compound having the formula



where T is alkyl of 4 to 14 carbon atoms, and R_4 is alkyl of 1 to 4 carbon atoms.

4,504,420

PRODUCING ACRYLONITRILE USING A PARTICULAR CATALYST

Jerry R. Ebner, St. Charles, Mo., assignor to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 320,403, Nov. 12, 1981, Pat. No. 4,415,482.
This application Sep. 21, 1983, Ser. No. 534,274
Int. Cl.³ C07C *120/14*
U.S. Cl. 260—465.3 **9 Claims**

1. A process for the production of acrylonitrile which comprises reacting at an elevated temperature in the vapor phase propylene, ammonia and molecular oxygen over a catalyst consisting essentially of catalytic elements having the empirical formula

$$BiMo_aV_bSb_cM_dO_x$$

wherein a is from 0.5 to 2, b is from 0.01 to 0.12, c is from 0.01 to 10, d is from 0 to 0.5, and x is taken to satisfy the valence requirements of the other elements present and wherein M is one or more elements selected from Groups I-A, II-A, III-A, V-A, VI-A, I-B, IV-B, VI-B and VII-B of the Periodic Table, said catalyst being prepared by forming a mixture containing a vanadium component, an antimony component, optionally a compound of M, and a hydrophilic bismuth molybdate component having the empirical formula

$$BiMo_aO_x \cdot Y(H_2O)$$

wherein a is from 0.5 to 2, x is taken to satisfy the valence requirements of the other elements present and Y is a number such that the bound water is 5 to 40 weight percent of the total component, forming said mixture into dry particles and calcining at a temperature of from 500° to 850° C.

4,504,421

PROCESS FOR PRODUCING AN ACETAL

Kanenobu Matsui; Shinichiro Uchiumi; Akira Iwayama, and Takashi Umezu, all of Ube, Japan, assignors to Ube Industries, Ltd., Yamaguchi, Japan

Continuation of Ser. No. 333,110, Dec. 21, 1981, abandoned.
This application Mar. 16, 1983, Ser. No. 475,750
Claims priority, application Japan, Dec. 23, 1980, 55-181332; Dec. 23, 1980, 55-181333; Jul. 30, 1981, 56-118410
Int. Cl.³ C07C *41/50, 120/00*
U.S. Cl. 260—465.6 **10 Claims**

1. A process for producing an acetal comprising the steps of:
introducing an olefin, an alcohol, and an ester of nitrous acid into a reaction system; and
contacting, in a vapor phase, the olefin, the alcohol, and the ester of nitrous acid in the presence of at least one component selected from the group consisting of platinum group metals and the salts thereof and an iron compound, provided that a halide is present in addition to the iron compound if the iron compound is not a halide of iron.

4,504,422

PROCESS FOR PRODUCING AN ACETAL

Kanenobu Matsui; Shinichiro Uchiumi; Akira Iwayama, and Takashi Umezu, all of Ube, Japan, assignors to Ube Industries, Ltd., Yamaguchi, Japan

Continuation of Ser. No. 333,110, Dec. 21, 1981, abandoned.
This application Mar. 16, 1983, Ser. No. 475,754
Claims priority, application Japan, Dec. 23, 1980, 55-181332; Dec. 23, 1980, 55-181333; Jul. 30, 1981, 56-118410
Int. Cl.³ C07C *41/50, 120/00*
U.S. Cl. 260—465.6 **10 Claims**

1. A process for producing an acetal comprising the steps of:
introducing an olefin, an alcohol, and an ester of nitrous acid into a reaction system; and
contacting, in a liquid phase, the olefin, the alcohol, and the ester of nitrous acid in the presence of (a) at least one component selected from the group consisting of platinum group metals and the salts thereof and (b) at least one halide, provided that the presence of said halide (b) is optional if said component (a) contains a halide.

4,504,423

PROCESS FOR PURIFYING DIBROMO-DICYANOBUTANE

Yoshikazu Higaki, and Hiroyuki Omori, both of Mie, Japan, assignors to Mitsubishi Yuka Fine Chemicals Co., Ltd., Tokyo, Japan

Filed Jan. 6, 1984, Ser. No. 568,793
Claims priority, application Japan, May 12, 1983, 58-82924
Int. Cl.³ C07C *121/20*
U.S. Cl. 260—465.7 **5 Claims**

1. A process for purifying dibromo-dicyanobutane which comprises washing dibromo-dicyanobutane with an aqueous solution of a compound in which the cationic component is an alkali metal, alkaline earth metal or ammonium ion, and the anionic component is an oxygen-containing anion selected from the group consisting of nitrate, sulfate, phosphate, formate and carbonate.

4,504,424
PROCESS FOR THE PREPARATION OF ARYLHYDRAZINE-N-SULFONIC ACIDS

Rüdiger Berthold, Bad Soden am Taunus, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Aug. 19, 1982, Ser. No. 409,409

Claims priority, application Fed. Rep. of Germany, Aug. 21, 1981, 3133100

Int. Cl.³ C07C *143/86*

U.S. Cl. 260—513.6 **10 Claims**

1. A method for making an arylhydrazosulfonate of the formula

$$R_nAr—NH—NH—SO_3M,$$

wherein

Ar is an aromatic isocycle or heterocycle,

R is the same or different alkyl, aryl, amino, hydroxyl, alkoxy, aryloxy, halogen, nitro, acylamino, carbamoyl, alkylcarbamoyl, arylcarbamoyl, dialkylamino, arylamino, sulfo, or sulfamoyl,

M is hydrogen, an alkali metal, or one equivalent of an alkaline earth metal, and

n is 0 or an integer from 1 to 5,

which method comprises reducing an arylazosulfonate of the formula

$$R_nAr—N=N—SO_3M$$

with hydrogen in a solvent in the presence of a transition metal catalyst.

4,504,425
PROCESS AND APPARATUS FOR EFFECTING CARBURETION

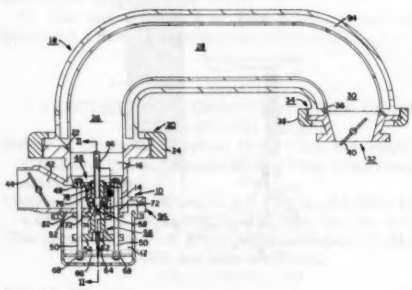
Darnell T. Dudley, East Lansing, and Herman F. Luhrs, Rapid City, both of Mich., assignors to Dynamic Technological Developments, Inc., East Lansing, Mich.

Filed Jun. 26, 1980, Ser. No. 163,180

The portion of the term of this patent subsequent to Jan. 12, 2000, has been disclaimed.

Int. Cl.³ F02M *7/22*

U.S. Cl. 261—50 A **34 Claims**



1. In a process for effecting carburetion of a gaseous component and a volatile liquid component of a reaction mixture which needs to be in a gaseous condition prior to the initiation of the reaction, which comprises, aspirating a portion of said gaseous component into a vaporizing chamber maintained at subambient pressure, mixing the remaining portion of said gaseous component with said liquid component in a cylindrical mixing chamber having a discharge end coaxial with a tubular aspirating extension which opens into said vaporizing chamber and an inlet end at the opposite end thereof; and aspirating the resultant mixture into said vaporizing chamber and allowing it to disperse therein; the improvement which comprises, effecting said mixing by aspirating a jet of said liquid component axially into said cylindrical mixing chamber through an axial liquid component jet orifice in the inlet end thereof; aspirating a plurality of jets of said gaseous component into said mixing chamber through gaseous component jet orifices located in the periphery thereof, oriented at an acute, oblique angle which impresses a circumferential whirling motion on a radial motion in which the incoming gaseous component meets the incoming liquid component head-on in a turbulent, rolling, toroidal vortex, thereby producing a mixture comprising an intimate dispersion of the liquid component in the gaseous component which rapidly vaporizes after it passes out of said tubular aspirating extension and flies out radially as a result of centrifugal force into said vaporizing chamber.

4,504,426
GAS-LIQUID CONTACTING APPARATUS

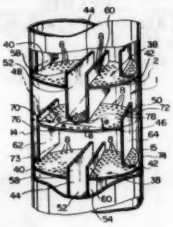
Karl T. Chuang, Deep River, and Allan E. Everatt, Chalk River, both of Canada, assignors to Atomic Energy of Canada Limited, Ottawa, Canada

Filed Apr. 4, 1983, Ser. No. 482,010

Claims priority, application Canada, Nov. 24, 1982, 416209

Int. Cl.³ B01F *3/04*

U.S. Cl. 261—114 R **1 Claim**



1. A gas-liquid contacting apparatus comprising:

(a) an upwardly extending casing for the liquid to flow downwardly therethrough and the gas to flow upwardly therethrough,

(b) a series of trays extending across and partitioning the casing at different levels, each tray being perforated across the whole of the area thereof with perforations for causing the liquid to be frothed by the gas, each tray having at least one liquid drainage opening therefrom for the frothed liquid, the liquid drainage openings of successive trays being laterally displaced in opposite directions in the casing to cause the frothed liquid to flow towards, and then away from, opposed casing sides across successive trays, and the perforations of each portion of a tray beneath a drainage opening occupying an area per unit area of the drainage opening in the range 0 to 25% less than that of the perforations per unit in the remainder of that tray,

(c) overflow weirs, adjacent the liquid drainage openings, for maintaining a layer of frothed liquid on each tray and from which the frothed liquid will overflow into the adjacent liquid drainage opening,

(d) for each drainage opening, a downcomer depending therefrom and for delivering the frothing liquid to a position above the level of the tray immediately below, and

(e) for each downcomer, a liquid distributing and gas entry retarding plate closing the outlet end of that downcomer, each plate having liquid distributing perforations distributed across the whole of the area of the side face thereof, each plate extending upwardly at an angle θ in the range 45° to 60° to the horizontal, in the direction for flow of liquid across the perforated tray immediately therebelow, the plate being intended to be immersed in the froth on the tray immediately therebelow, and wherein the improvement comprises,

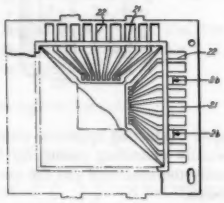
(f) alternate trays have a central liquid drainage opening and these trays are interposed with trays having two liquid drainage openings adjacent opposite sides of the casing so that the apparatus is a two flow path apparatus wherein the flow paths alternately flow towards and then away from each other, and for each liquid drainage opening there is provided an overflow weir, a downcomer, and a liquid distributing and gas entry retarding plate closing the outlet end of that of the downcomer, each plate having liquid distributing perforations distributed across the whole area of the side face thereof, and the plates for the dowcomers of the central drainage openings being in two halves which together form a V-shape by each plate half extending upwardly at an angle θ in the range 30° to 60° to the horizontal in the direction for flow of liquid therefrom across the perforated tray immediately therebelow.

4,504,427

SOLDER PREFORM STABILIZATION FOR LEAD FRAMES

Harold W. Moyer, Allentown, Pa., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jun. 17, 1983, Ser. No. 505,338
Int. Cl.³ B29C *6/04*
U.S. Cl. 264—25 **5 Claims**



1. Method for mold encapsulating an electrical device wherein the device has a plurality of electrical leads arranged to extend beyond the molded encapsulant and wherein a spacer element is applied to the leads to maintain the leads in a desired spatial relationship during the mold encapsulating process the invention characterized in that the spacer element is formed of a material that melts preferentially with respect to the material of the metal leads and the invention further characterized by melting the spacer element without melting the electrical leads or the encapsulant after the mold encapsulating process.

4,504,428

METHOD FOR MAKING REINFORCED CONCRETE PRODUCTS

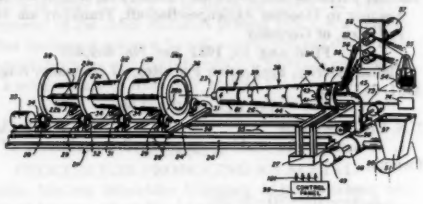
Philip L. Rotondo, 8 Watson Dr., Simsbury, Conn. 06070, and Thomas J. Rotondo, 173 Old Farms Rd., Avon, Conn. 06001

Division of Ser. No. 111,168, Jan. 10, 1980, Pat. No. 4,404,786.
This application Apr. 4, 1983, Ser. No. 481,931
Int. Cl.³ E04B *1/16*
U.S. Cl. 264—34 **6 Claims**

1. A method of producing reinforced concrete structures comprising the steps of

serially introducing layers of concrete in a form,

cyclically feeding, cutting and forcibly bodily throwing off, at spaced intervals, straight axially oriented cut lengths of reinforcing wire at least 10 inches in length into each layer



whereby said wires are imbedded in parallel ordered arrays, and

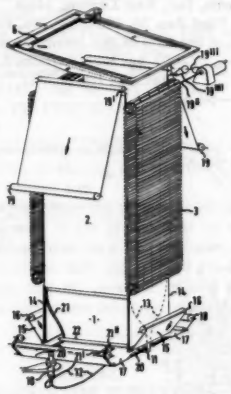
curing said layered structure.

4,504,429

METHOD AND APPARATUS FOR THE CONTINUOUS UPWARD PRODUCTION OF FOAMED MATERIAL

Anthony C. M. Griffiths, Bedford, England, assignor to Hyman International Limited, Lancashire, England

PCT No. PCT/GB82/00040, § 371 Date Oct. 5, 1982, § 102(e) Date Oct. 5, 1982, PCT Pub. No. WO82/02851, PCT Pub. Date Sep. 2, 1982
PCT Filed Feb. 15, 1982, Ser. No. 438,879
Claims priority, application United Kingdom, Feb. 18, 1981, 8105078
Int. Cl.³ B29D *27/04*
U.S. Cl. 264—40.5 **26 Claims**

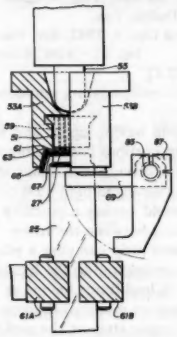


1. A method of continuous upward production of foamed material, in which foam forming liquid reactant materials are mixed and fed at a controlled rate to a sealed feed zone leading into an upwardly diverging expansion enclosure wherein foaming takes place and thence into an upwardly extending take-off path for expanded foam, the feed zone being continuous with the expansion enclosure, in which the expansion enclosure is defined above by already expanded foam in the take-off path and at the sides by travelling sheet material positively drawn upward from above the expansion enclosure so that the surface of the body of expanding foam and the travelling sheet material move together; and in which controllably driven conveyor means are provided at one

4,504,430
METHOD FOR CASTING A BASE DIRECTLY ON AN ELECTRON TUBE

Myron H. Wardell, Jr., Lititz, Pa., assignor to RCA Corporation, New York, N.Y.

Filed May 16, 1983, Ser. No. 495,118
Int. Cl.³ B29D *27/00*; B29F *1/10*
U.S. Cl. 264—46.4 **13 Claims**



7. A method for casting a base directly on an electron tube, said tube comprising an envelope including a glass stem and relatively-stiff metal stem leads sealed in and extending out from said stem, said method including

A. detachably coupling a mold to said leads and said stem, said mold and said stem substantially defining a chamber for casting said base,

B. producing a temporary pressure seal between said mold and said stem including applying static pressure therebetween in a direction that is substantially perpendicular to the surface of said stem surface,

C. and injecting liquid castable material into said chamber at substantial hydraulic pressure while maintaining said static pressure.

8. The method defined in claim **7** wherein said castable material is an organic composition that is injected at temperatures in the range of 20° to 375° C.

10. The method defined in claim **8** wherein said castable material is a foaming-type organic composition.

4,504,431
ELECTRICALLY CONDUCTIVE FIBER GLASS ARTICLES AND SHEETS

Robert E. Mollman, Moreland Hills, Ohio, and Ralph Silva, Springboro, Pa., assignors to Molded Fiber Glass Companies, Ashtabula, Ohio

Continuation-in-part of Ser. No. 421,530, Sep. 22, 1982, Pat. No. 4,438,059. This application Nov. 2, 1983, Ser. No. 547,965
The portion of the term of this patent subsequent to Mar. 20, 2001, has been disclaimed.
Int. Cl.³ B29G *1/00*
U.S. Cl. 264—105 **9 Claims**

1. A method of making an electrically conductive laminate comprising,

providing a thermoset resin,

adding sufficient carbon black to the material to give the material the desired electrical conductivity,

adding a pigmentation material to said carbon black and polymer to partly overcome the pigmentation effect of the carbon black,

mixing said carbon black and pigmentation material to completely disperse the carbon and pigment in the resin,

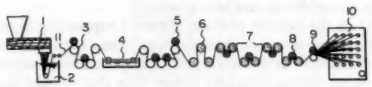
said pigmentation being added in an amount of 15 percent to 120 percent by weight of said resin,

said pigmentation being selected from the group consisting of titanium dioxide, chromium oxide green, brown iron oxide, antimony oxide and ultra marine blue material, and adding a catalyst to the material to form a paste, adding the paste to fiber glass and curing the resin.

4,504,432
PROCESS FOR PRODUCING A MONOFILAMENT HAVING HIGH TENACITY

Ryosuke Kamei, Yokohama; Toyoaki Tanaka; Takeshi Sano, both of Kawasaki, and Masataka Kotani, Yokohama, all of Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 444,673, Nov. 26, 1982, abandoned, which is a continuation-in-part of Ser. No. 318,122, Nov. 4, 1981, abandoned. This application Jan. 23, 1984, Ser. No. 572,610
Claims priority, application Japan, Sep. 4, 1981, 56-138316
Int. Cl.³ D01D *5/12*
U.S. Cl. 264—177 F **36 Claims**



21. A process for producing a monofilament having a high tenacity from a thermoplastic resin, wherein a monofilament is melt spun at a temperature of 220° C. to 310° C. from a thermoplastic resin through a nozzle having a cross-sectional area S (mm^2) satisfying the following equations:

$$0.503\ mm^2 \leqq S \leqq 3.14\ mm^2$$

$$0.09 \leqq \frac{I}{S^2} \leqq 0.30$$

wherein I is a maximum cross-sectional secondary moment max (Ix, Iy) (i.e., the maximum secondary moment in the cross-sectional secondary moments with respect to the main X axis and y axis passing through the center of the gravity of the cross-section); and, then, is subjected to multi-stage stretching under the conditions satisfying the following equations:

$$DR_{Ti} \geqq 5$$

$$DR_{Ti} = \frac{V_{i+1}}{V_1} \leqq DR_{Tiw} \times (1.0 - 0.0970e^{-0.312 \times i})$$

$$\theta_i \leqq T_m - 37 \ (i = 1)$$

$$T_m - 27 \leqq \theta_i \leqq T_m - 17 \ (i \geqq 2)$$

wherein i is a number of stretching stages, e is a base of natural logarithm (i.e., 2.71828), V_1 is the first take-off linear velocity (m/min), V_{i+1} is the final take-off linear velocity (m/min) at the i-stretching stage, DR_{Ti} is the stretching ratio at the first stretching stage, DR_{Ti} is the total stretching ratio at the i-stretching stage, DR_{Tiw} is the DR_{Ti} from which the monofilament begins to become whitened at the i-stretching stage, T_m is the melting point of the thermoplastic resin and θ_i is the temperature of the filament at the i-stretching stage.

4,504,433

PROCESS FOR PREPARATION OF SOAP ARTICLES CONTAINING DRIED SHAPES OF SOAP

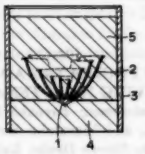
Emiko Inui; Takao Iwano, both of Osaka; Seishi Hara, Nara; Yukio Mikami, Shizuoka; Hideo Kurita, Tokyo, and Yoshiaki Aoki, Kanagawa, all of Japan, assignors to Pola Chemical Industries, Inc., Shizuoka and Sanwa Chemical Industries, Inc., Ltd., Osaka, both of, Japan

Filed Aug. 24, 1982, Ser. No. 411,069

Claims priority, application Japan, May 19, 1982, 57-84179

Int. Cl.³ B29D *3/00;* **B29C** *9/00*

U.S. Cl. 264—232 **5 Claims**



1. A process for the preparation of a soap article containing an embedded dried shape also formed of soap, comprising the steps of

forming a desired shape from a colored soap made from a first soap composition containing water, and drying said shape,

providing a second soap composition which is a transparent soap composition containing water,

placing on the bottom of frame means a supporting layer of said second soap composition which has been cooled to solidification but not dried, said transparent soap supporting layer having a height lower than that of said frame means;

placing said desired dried shape of colored soap on said transparent soap supporting layer; and fixing said dried shape on said supporting soap layer,

pouring into said frame means a molten dough of said second transparent soap composition

and cooling said molten dough to solidification; thereby fusing said dough with said supporting layer, there being complete integration of said layer and said supporting molten dough to prevent separation;

removing the thus solidified transparent soap including said supporting layer from said frame means,

and drying said soap.

4,504,434

PROCESS AND POLYMER BLEND COMPOSITION FOR STRETCH WRAP FILM

Barry A. Cooper, Wayzata, Minn., assignor to Bemis Company, Inc., Minneapolis, Minn.

Division of Ser. No. 119,192, Feb. 2, 1980, Pat. No. 4,425,268. This application Dec. 1, 1982, Ser. No. 446,056

Int. Cl.³ C08J *5/18, 7/10;* **C08L** *23/04, 23/20*

U.S. Cl. 264—22 **19 Claims**

1. A method for producing a film adapted for use in stretch wrap packaging comprising the steps of:

preparing a polymer blend comprising:

between about 40 and about 90% by weight of a high molecular weight copolymer of ethylene and vinyl acetate containing between about 4 and about 25% by weight of repeating units derived from vinyl acetate and having a melt index of between about 0.1 and about 4.0,

between about 8 and about 55% by weight of a linear copolymer of ethylene and a higher alkene, said linear copolymer having a specific gravity of between about 0.917 and about 0.945, and

between about 0.5 and about 6% by weight of a tackifier selected from a group consisting of low molecular weight polyisobutene, amorphous polypropylene, and microcrystralline wax; and

extruding said blend to produce a plastic film.

4,504,435

METHOD FOR SEMICONDUCTOR DEVICE PACKAGING

John W. Orcutt, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 4, 1982, Ser. No. 432,594

Int. Cl.³ B29C *6/04*

U.S. Cl. 264—272.17 **4 Claims**

1. A method of encapsulating semiconductor devices, comprising:

providing a mold having upper and lower parts, the parts having facing portions cooperating to form a plurality of cavities for receiving the semiconductor devices, the cavities being arranged in at least two adjacent rows, one part of the mold having a plurality of depressions at selected locations between the rows;

providing a metal strip carrying a plurality of lead frames arranged to correspond to the locations of the cavities in the mold, each lead frame having at least one of the semiconductor devices mounted thereon;

positioning the metal strip on the mold;

providing plastic pellets at locations corresponding to the locations of the depressions in the mold in contact with a surface of the metal strip;

and bringing the upper and lower parts of the mold together to cause the plastic to flow under pressure out of the depressions along the surface of the strip into the cavities to surround the semiconductor devices therein.

4,504,436

PROCESS AND APPARATUS FOR REDENSIFYING THERMOPLASTIC RESIN FOAM

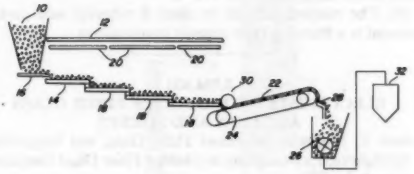
Yvon Louvier, Haine St. Pierre, Belgium, assignor to Synfina, S.A., Brussels, Belgium

Filed Jul. 7, 1983, Ser. No. 511,599

Claims priority, application Luxembourg, Jul. 16, 1982, 84277

Int. Cl.³ B29D *27/00*

U.S. Cl. 264—321 **17 Claims**



1. A process for increasing the apparent density of foamed thermoplastic resin waste material comprising the steps of:

(a) reducing said waste material to particle form;

(b) introducing said waste material uniformly across at least one vibrating plate in an overhead-heated chamber to expose the material to heat emanating from above the vibrating plate;

(c) transporting said waste material such that the waste material particles tumble through the overhead-heated chamber;

(d) exposing the waste material to a progressively increasing temperature in said overhead-heated chamber of at least 120° C. at the overhead-heated chamber inlet to less than about 210° C. at the overhead-heated chamber outlet;

(e) reducing the volume of the waste material at least 75% by compaction; and,

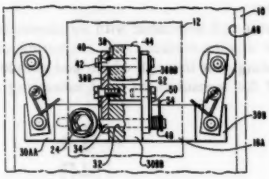
(f) cooling the compacted waste material.

4,504,437

SEISMIC RESTRAINT MEANS FOR A NUCLEAR RADIATION DETECTOR MOUNTED IN A TUBULAR THIMBLE

Richard H. Underwood, and William H. Todt, both of Elmira, N.Y., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 26, 1982, Ser. No. 382,437
Int. Cl.[3] G01T *3/00*; G21C *9/00*
U.S. Cl. 376—153 3 Claims



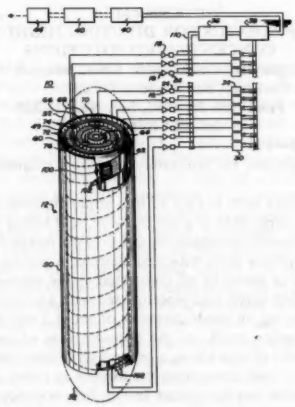
1. In combination, an elongated tubular thimble adapted to be vertically disposed about a nuclear reactor vessel, a generally cylindrical nulcear radiation detector diposed within the tubular thimble, and seismic restraint means comprising a split clamp ring which is securably connectable about the generally cylindrical radiation detector with a plurality of symmetrically spaced support means pivotally mounted from and extending outwardly from the split clamp ring, with low friction thimble contact means disposed at the extending end of each support means, and wherein spring bias means are coupled to each respective pivotally mounted support means, biasing each means radially outwardly so that the contact means engage the thimble with a constant predetermined force which minimizes seismic vibration acting on the radiation detector.

4,504,438

METHOD AND APPARATUS FOR DETERMINING THE DENSITY CHARACTERISTICS OF UNDERGROUND EARTH FORMATIONS

Richard H. Levy, 4124 55th Ave. NE., and Paul M. Mockett, 4209 55th Ave. NE., both of Seattle, Wash. 98105

Filed Dec. 7, 1981, Ser. No. 327,751
Int. Cl.[3] G01V *5/00*; G21G *1/06*
U.S. Cl. 376—156 20 Claims



1. A detector module for detecting the flux and trajectories of muons, comprising:

a gas chamber containing ionization gas;

plural annular, coaxial cylindrical grid structures within said chambers each comprising:

cylindrically arranged sensing wires disposed within the chamber and arranged so that when a muon passes through the chamber electrical signals are produced in the wires which are indicative of a first vector component of the muon; and

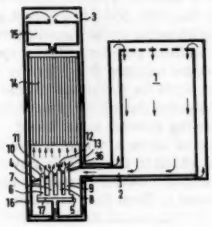
pickup wires disposed angularly to the sensing wires, in which pickup wires electrical signals are induced by the signals of the sensing wires which pickup wire signals are indicative of a second vector component of the muon passing through the chamber.

4,504,439

GAS COOLED NUCLEAR REACTOR

Claus Elter, Bad Durkheim; Karl U. Schneider, Betzdorf; Josef Schöning, Hambrücken; Heinrich Stach, Ilvesheim, and Wilfried Stracke, Oftersheim, all of Fed. Rep. of Germany, assignors to Hochtemperatur-Reaktorbau GmbH, Cologne, Fed. Rep. of Germany

Filed Aug. 14, 1981, Ser. No. 292,801
Claims priority, application Fed. Rep. of Germany, Aug. 14, 1980, 3030697
Int. Cl.[3] G21C *9/00*; G21D *1/00*
U.S. Cl. 376—391 12 Claims



1. A gas cooled nuclear reactor comprising: a reactor core, at least one closed circuit having a heat absorbing member for receiving cooling gas from said reactor core, a hot gas conduit and a cold gas conduit connecting said heat absorbing member to said reactor core and means for mixing at least a portion of a cooled cooling gas from an outlet side of said heat absorbing member with hot gas downstream of said reactor core and in said hot gas conduit, said means comprising at least one adjustable valve, a conduit connecting said valve with said cold gas conduit and a plurality of tubes projecting into said hot gas conduit, and a distributor head having a plurality of orifices mounted on each of said tubes for dispersing cold gas into said hot gas conduit thereby controlling the temperature of said cooling gas.

4,504,440

PROCESS FOR BONDING REFRACTORY TO SURFACES

Cord H. Sump, Chattanooga, Tenn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Sep. 23, 1983, Ser. No. 535,130
Int. Cl.[3] C22C *33/00*
U.S. Cl. 419—3 7 Claims

1. A process for forming a mat out of metal fibers including

dispersing a finely-divided brazing material through a viscous liquid-like material which will decompose during brazing and leave no residue, coating the fibers with the mixture of brazing material and viscous liquid-like material to spread the brazing material evenly over the fibers, forming the coated fibers in a layer over the surface of a support member, the surface of the support member being of such a material that it will not become brazed to the fibers when brazing temperature is applied thereto, placing the coated fibers and support member in an atmosphere having a temperature high enough to decompose the liquid-like material and braze the fibers together into a loosely formed mat, removing the mat from the support member, reducing the thickness of the mat, thereby increasing the density of the mat, and thereafter again placing the mat in an atmosphere having a temperature high enough to again melt the brazing material, rebrazing the fibers together into a more dense mat of unusual strength.

4,504,441

METHOD OF PREVENTING SEGREGATION OF METAL POWDERS

Geoffrey S. Kuyper, Addison, Ill., assignor to AMSTED Industries Incorporated, Chicago, Ill.

Filed Aug. 1, 1983, Ser. No. 519,516
Int. Cl.³ B22F *1/00, 1/02*
U.S. Cl. 419—35 **5 Claims**

1. A method of preventing segregation of admixed powder additives from a metallic powder mixture having a higher specific gravity than said powder additive, including the steps of adding during blending to the metallic powder mixture from 0.5–6.0% of an additive powder of lower specific gravity than the metallic powder mixture, 0.5–1.5% by weight of furfuryl alcohol and 0.25–1.0% by weight of an acid sufficient to polymerize the said alcohol during blending whereby to produce a dry and free flowing powder metal blend.

2. The method of claim 1, wherein about 1% by weight of wax lubricant is added to the metallic powder mixture during blending, the metallic powder mixture is placed in dies, compacted and sintered to form final products.

4,504,442

USE OF CHLORINE DIOXIDE GAS AS A CHEMOSTERILIZING AGENT

David H. Rosenblatt, Baltimore, Md.; Aaron A. Rosenblatt, New York, N.Y., and Joseph E. Knapp, Pittsburgh, Pa., assignors to Scopas Technology Corporation, New York, N.Y.

Filed Oct. 19, 1982, Ser. No. 435,331
Int. Cl.³ A01N *1/00*
U.S. Cl. 422—37 **20 Claims**

1. A method of sterilizing comprising contacting gas impermeable surfaces contaminated with bacterial spores with an effective amount of gaseous chlorine dioxide wherein said contacting is performed at a temperature which does not overly exceed ambient temperature and for at time period sufficient to kill the bacterial spores on said contaminated surface.

4,504,443

STOP-FLOW ANALYSIS

Elo H. Hansen, Lyngby, and Jaromir Ruzicka, Holte, both of Denmark, assignors to Bifok AB, Sollentuna, Sweden

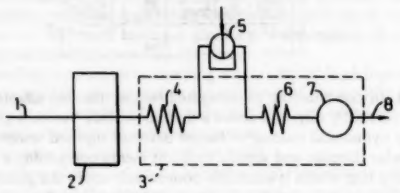
Division of Ser. No. 296,256, Aug. 26, 1981, Pat. No. 4,399,225, which is a continuation of Ser. No. 48,002, Jun. 13, 1979, abandoned. This application May 31, 1983, Ser. No. 499,199
Claims priority, application Sweden, Jun. 14, 1978, 7806853
The portion of the term of this patent subsequent to Feb. 19, 1999, has been disclaimed.
Int. Cl.³ G01N *31/14*
U.S. Cl. 422—81 **7 Claims**

1. An apparatus for determining the rate of reaction of a sample at different selected sample concentrations within a sample mixture slug comprising:

means for forming a non-air segmented carrier stream in a carrier stream conduit, said carrier stream conduit having an upstream end and a downstream end and said means for forming a non-air segmented carrier stream including a pump for propelling said carrier stream;

means for introducing a sample into said carrier stream to form a sample mixture slug having a forward head portion, a rearward tail portion and a central portion, said sample dispersing within said sample mixture slug to form reproducible concentration gradients in said head and tail portions in which the concentration of said sample in said carrier stream varies laterally through said head and tail portions;

a measuring cell associated with the downstream end of said carrier stream conduit, said measuring cell including a measuring zone through which said sample mixture slug is passed for measurement, said measuring zone having a



sufficiently small volume to measure discrete segments of said concentration gradients;

means for flowing said carrier stream and sample mixture slug through said carrier stream conduit to said measuring cell without removing the head portion or tail portion from said sample mixture slug;

means for stopping said pump to stop the flow of said carrier stream through said measurement zone in response to one or more different selected concentrations of sample within one of said concentration gradients as said sample mixture slug passes through said measuring cell; and

means for measuring the reaction of said sample at one or more different discrete segments of said concentration gradients corresponding to said selected sample concentrations for a period of time whereby the rate of reaction of said sample at said different selected sample concentration may be determined.

4,504,444

APPARATUS FOR DILUTING HIGHLY CONCENTRATED SOLUTIONS

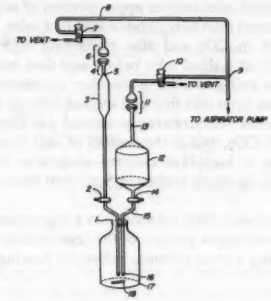
Hank E. Englander, Costa Mesa, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Oct. 26, 1981, Ser. No. 315,323
Int. Cl.³ B01L *3/02*
U.S. Cl. 422—100 **2 Claims**

1. An apparatus for accurately diluting a solution comprising:

(a) a capillary stem having a 2 mm inside diameter connected to the output side of a teflon valve, said teflon valve having a diameter substantially equal to the inside diameter of said capillary stem attached thereto, a pipette having a volume of about 15 ml connected to the opposite side of said teflon valve, said pipette fitted with a second capillary stem having an inside diameter of about 2 mm containing a graduation mark on the opposite side of said pipette connected to said valve, a ground glass joint fitted to said capillary stem connecting to a three-way valve, said three-way valve having a vent line, a line connected to said pipette, and a line connected to an aspirator, the aspirator line having a T-connection therein connected to a second three-way valve and a second ground glass joint connected to a second pipette having a volume of about 150

ml, said second pipette having 2 mm inside diameter capillary stems on opposite sides of said pipette, and a second teflon valve connected to a capillary stem opposite to said



ground glass joint, said capillary stem connected to said valve having a structure so as to fit within the neck of a flask.

4,504,445

METHOD AND APPARATUS FOR GENERATING ULTRAVIOLET RADIATION AND OZONE

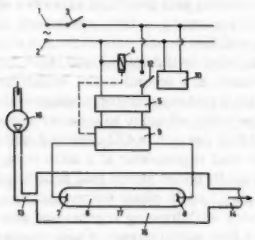
Alfred Walz, Am Kurzarm 7, D-7830 Emmendingen, Fed. Rep. of Germany

Filed Sep. 6, 1983, Ser. No. 529,507

Claims priority, application Fed. Rep. of Germany, Sep. 3, 1982, 3232802

Int. Cl.³ B01J *1/10*

U.S. Cl. 422—186.15 **7 Claims**



1. A method for generating ultraviolet radiation, preferably in the wavelength range between approximately $\lambda=150$ and $\lambda=350$ nanometers, wherein ozone is produced at about $\lambda=185$ nm and germicidal radiation is produced at about $\lambda=260$ nm, from electrical energy which is converted into radiation energy in low-voltage gas discharge tubes each having one pair of electrodes, wherein the material making up the walls of these tubes is highly transparent to the above λ range and the interior of the tubes is filled with an appropriate mixture of gas vapor and mercury vapor, preferably for water purification, characterized in that the gas discharge lamp is powered from an alternating current source (50 or 60 Hz) using a supply circuit device dimensioned for the maintaining voltage and the maintaining current in the form of a voltage multiplier circuit made up of rectifier diodes and capacitors and using at least one ignition circuit furnishing high voltage and of comparatively lower output, the supply circuit and ignition circuit being combined into one voltage multiplier circuit comprising a plurality of voltage stages connected in series, and the gas discharge lamp is operated in direct-current operation, using a smoothing choke.

4. An apparatus for generating ultraviolet radiation in the wavelength range between approximately $\lambda=150$ and $\lambda=300$ nanometers, wherein ozone is produced in the wavelength range of $\lambda=185$ nm and germicidal radiation is produced in the wavelength range $\lambda=260$ nm, from electrical energy which is converted into radiation energy in low-voltage gas discharge tubes each having one pair of electrodes, wherein the material making up the walls of these tubes is known per se and highly transparent to the above λ range and the interior of which is filled with a mixture, known per se, of gas vapor and mercury vapor, preferably for water purification, characterized by a gas discharge lamp (6) in a treatment chamber (15) having an air supply tube (13) and air exhaust tube (14), with a gas-filled, UV-transparent tube (17) and with electrodes (7, 8) which are supplied from an alternating current mains network (1, 2) by a direct voltage multiplier circuit (5) and with an ON switch (3) connected to the mains network (1,2).

4,504,446

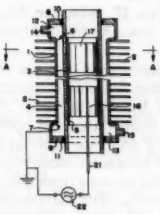
OZONE GENERATOR

Wojciech Kunicki, Warsaw, Poland, and Gilbert S. Jackson, Bethesda, Md., assignors to OPT Systems, Bethesda, Md.

Filed Nov. 25, 1981, Ser. No. 324,916

Int. Cl.³ C01B *13/11*

U.S. Cl. 422—186.19 **19 Claims**



1. A gas-cooled ozone generator having paired tubular concentric electrodes and a solid dielectric disposed therebetween, characterized in that the outer electrode is provided with cooling flanges and spaced from the dielectric such that an annular gap is formed, that the axial ends of said gap are sealed by annular spacers, that the dielectric and the inner electrode have open ends to allow throughflow of cooling gas, and that cooling of the dielectric and of the inner electrode is effected by means of at least one expandable body which is disposed inside the inner electrode, against which the body abuts, and which is open to throughflow of cooling gas, said body comprising a sheet formed into a cylinder with two inwardly directed flanges.

4,504,447

SLAB REFORMER

Francis R. Spurrier, Whitehall; Egon A. DeZubay, Mt. Lebanon; Alexander P. Murray, Murrysville, and Edward J. Vidt, Churchill, all of Pa., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Division of Ser. No. 321,131, Nov. 13, 1981, Pat. No. 4,430,304. This application Oct. 27, 1983, Ser. No. 546,260

Int. Cl.³ F28D *21/00*

U.S. Cl. 422—204 **6 Claims**

1. A catalytic reformer comprising:

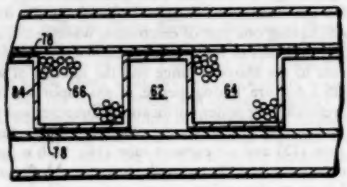
a pair of spaced parallel plates;

a corrugated sheet sandwiched between said plates so as to form a plurality of generally U-shaped elongated parallel channels between said plates;

a catalytic material retained within at least some of said channels;

means for flowing a reformable gaseous medium through a selected number of said channels in a first direction and

then through some other of said channels in a parallel and opposite direction; and



means for flowing a hot combustion gas across said plates and in thermal interexchange with said reformable gaseous medium.

4,504,448

ACTIVATED CARBON ADSORPTION OF FLOTATION REAGENTS FROM TUNGSTEN SOLUTIONS

Dennis E. Voelker, Ft. Madison, Iowa; Leo W. Beckstead, and Robert F. Hogsett, both of Arvada, Colo., assignors to Amax Inc., Greenwich, Conn.

Filed Feb. 27, 1984, Ser. No. 583,904

Int. Cl.³ C01G *41/00*

U.S. Cl. 423—54 **4 Claims**

1. In a hydrometallurgical process for the extraction of tungsten from tungsten flotation concentrates, wherein a concentrate containing by weight about 2% to 70% WO_3 is leached at elevated temperature and pressure with an alkaline solution to provide a pregnant aqueous solution of said contained tungsten, said flotation concentrate containing carbonaceous organic material derived from flotation reagents used to produce said concentrate, with carbonaceous organic material causes foaming during hydrometallurgical treatment and which also contaminates and adversely affects the subsequent solvent extraction of said tungsten from said solution, the improvement which comprises:

adding an effective amount of activated carbon to said tungsten-containing solution sufficient to adsorb and remove said carbonaceous organic material therefrom,

said activated carbon having a surface area of at least about 1000 M^2 per gram and an iodine number of over 900,

and then separating said activated carbon from said tungsten-containing pregnant solution,

thereby providing a tungsten-containing solution cleansed of carbonaceous organic material such that the foaming thereof is substantially inhibited and such that contamination of organic solvent in a subsequent solvent extraction step is substantially avoided.

4,504,449

PROCESS OF REGENERATING ABSORBENT SOLUTIONS FOR SULFUR-CONTAINING GASES

Alexander Doerges; Johann Schlauer; Manfred Kriebel, and Anton Hude, all of Frankfurt am Main, Fed. Rep. of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jun. 13, 1983, Ser. No. 503,487

Claims priority, application Fed. Rep. of Germany, Jun. 16, 1982, 3222588

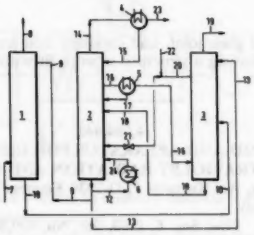
Int. Cl.³ B01D *53/34*

U.S. Cl. 423—228 **13 Claims**

1. In a process of regenerating a laden absorbent solution used in an absorption zone to desulfurize a gas which contains H_2S and CO_2 and possibly COS, said absorbent solution containing at least one highly volatile secondary amine in an organic solvent, wherein

(A) said laden absorbent solution (first solution) withdrawn from said absorption zone and being laden with H_2S and CO_2 and possibly COS is fed into a re-absorber at a first inlet, said re-absorber being a plate column, the pressure in said re-absorber being lower than in said absorption zone, feeding regenerated absorbent solution (second solution) at a second inlet into an upper portion of said re-absorber, said second inlet being above said first inlet, feeding a first gas rich in CO_2 and also containing H_2S into said re-absorber at a third inlet below said first inlet, contacting said gas rising in said re-absorber countercurrent to said solutions from said first and second inlet, at the top of said re-absorber withdrawing a second gas consisting essentially of CO_2, and at the bottom of said re-absorber withdrawing a high-H_2S content absorbent solution (third solution) having a higher H_2S content than said first solution,

(B) feeding said third solution into a regenerator at a fourth inlet at the upper portion of the regenerator, said regenerator being a plate column, indirectly heating the contents



of the lower portion of said regenerator to produce vapors therein which rise upwardly in said regenerator, at the top of said regenerator at a first outlet withdrawing overhead vapors, cooling said overhead vapors to ambient temperature and separating a first condensate and a third gas, feeding said first condensate to the top of said regenerator at a fifth inlet, withdrawing said third gas having a high H_2S content, at a second outlet withdrawing a stream of vapors from said regenerator, cooling said vapors to ambient temperature whereby to separate a second condensate and said first gas rich in CO_2, feeding said second condensate into said regenerator at a sixth inlet, said sixth inlet being 1 to 10 plates above said fourth inlet, said second outlet being 1 to 10 plates below said first outlet and said regenerator withdrawing regenerated absorbent solution, feeding a first partial stream of said regenerated absorbent solution to the top of said absorption zone and using a second partial stream of said regenerated absorbent solution as said second solution.

4,504,450

SULFUR OXIDES AND NITROGEN OXIDES GAS TREATING PROCESS

James T. Forbes, Arlington Heights, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Dec. 20, 1983, Ser. No. 451,513

Int. Cl.³ B01J *8/00*; C01B *21/00, 17/00*

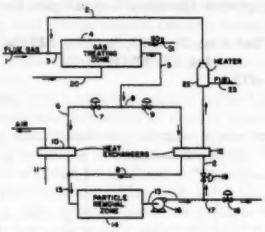
U.S. Cl. 423—239 **18 Claims**

1. A gas treating process for reducing the concentration of sulfur oxides and nitrogen oxides which comprises the steps of:

(a) admixing a hereinafter characterized recycle gas stream into a feed gas stream containing sulfur oxides and nitrogen oxides and passing the resultant admixture through a treating zone in which the concentration of the sulfur oxides and nitrogen oxides is reduced to a level below that in the feed gas stream to form a treated gas stream;

(b) cooling a first portion of the treated gas stream in a first heat exchange means used to heat air fed to the source of the feed gas stream;

(c) cooling a second portion of the treated gas stream in a second heat exchange means used to heat said recycle gas stream; and,



(d) discharging the first portion of the treated gas stream from the process and recycling the second portion of the treated gas stream as said recycle gas stream, which is heated and then admixed with the feed gas stream.

4,504,451

DRY SCRUBBING OXIDES AND PARTICULATE CONTAMINANTS FROM HOT GASES

Jack A. Quee, and Mark P. Haak, both of Fond du Lac, Wis., assignors to Dec International, Inc., Madison, Wis.

Filed Jul. 14, 1983, Ser. No. 513,902
Int. Cl.³ C01B *17/00*
U.S. Cl. 423—242 **9 Claims**

1. A process for dry scrubbing a hot gas containing sulfur oxides comprising the steps of

(a) introducing the gas into the spray zone of a spray dryer having a primary spray drying zone and at least one gas outlet;

(b) providing a formanious collecting member extending through the primary spray drying zone of the spray dryer between the spray zone and the gas outlet and supported for transverse movement relative to the primary spray drying zone;

(c) concurrently contacting the gas in the spray zone with minute droplets containing a liquid and solid particles of an alkali or alkaline reactant to react the sulfur oxides with the reactant;

(d) establishing a pressure drop across the collecting member so as to force a substantial portion of the gas through the collecting member;

(e) allowing the droplets to partially dry to the point where the surfaces are in a tacky condition by the time they reach the collecting member, whereby the tacky droplets are collected on the collecting member and become bonded together to form a mat having a sufficient porosity to permit the gas to flow therethrough;

(f) continuing to pass the gas through the mat to further react the sulfur oxides with the reactant and produce a dried mat containing the reaction products of sulfur oxides and the reactant;

(g) removing the mat from the primary spray drying zone by moving the collecting member transversely relative to the primary drying zone; and

(h) removing the mat from the collecting member.

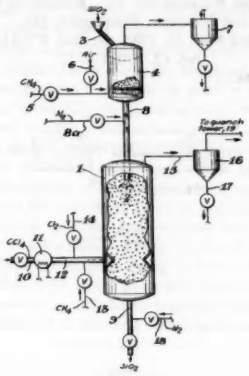
4,504,452

COPRODUCTION OF PERCHLOROETHYLENE, PHOSGENE, AND SILICON TETRACHLORIDE

Ludo K. Frevel, 1205 West Park Dr., Midland, Mich. 48640

Filed Sep. 16, 1983, Ser. No. 532,893
Int. Cl.³ C01R *33/08*
U.S. Cl. 423—341 **10 Claims**

1. A process for the coproduction of perchloroethylene, phosgene, and silicon tetrachloride which comprises contacting carbon tetrachloride with porous silica having a surface



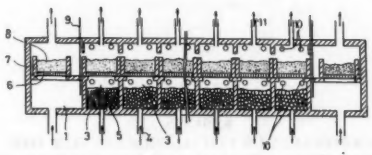
area from about 0.1 to about 30 m^2/g at a reaction temperature between about 800° and about 950° C.

4,504,453

METHOD OF MANUFACTURING CRYSTALLINE SILICON CARBIDE

Minoru Tanaka, Kobe; Tadashi Kawabe, and Masafumi Kobune, both of Ako, all of Japan, assignors to Tateho Kagaku Kogyo Kabushiki Kaisha, Japan

Filed Mar. 17, 1983, Ser. No. 476,199
Claims priority, application Japan, Jun. 4, 1982, 57-96791
Int. Cl.³ C01B *31/36*
U.S. Cl. 423—345 **17 Claims**



1. A method of manufacturing silicon carbide comprising the following steps:

(a) providing a silicon and carbon containing material having sufficient thinness and porosity to permit the passage of a gas therethrough;

(b) arranging said material on a gas-permeable, heat-resistant support;

(c) placing the material-bearing support in an air tight furnace, said air tight furnace adapted to provide at least three temperature zones covering the range of about 400° C. to a high of at least 1,300° C., each of said temperature zones having a substantially different temperature;

(d) moving said material-bearing support successively through said temperature zones, in the direction of increasing temperature;

(e) maintaining said material-bearing support means in each of said temperature zones for at least one hour;

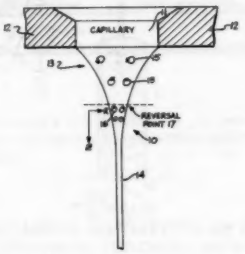
(f) passing a non-oxidizing gas through the heated material to remove impurities while the material is in each temperature zone below 1,300° C.; and

(g) removing silicon carbide whisker-containing material from said furnace.

4,504,454
PROCESS OF SPINNING PITCH-BASED CARBON FIBERS

Dennis M. Riggs, Simpsonville, S.C., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 28, 1983, Ser. No. 479,415
Int. Cl.³ D01F 9/12
U.S. Cl. 423—447.1 16 Claims



1. A method of spinning a pitch precursor feed material to produce a continuous pitch-base carbon fiber having a substantially ordered graphite crystallite orientation and a longitudinal alignment comprising undulating ribbons, which comprises spinning a mesophase pitch precursor feed material through open spinnerette capillaries, internally free of porous bodies, under such conditions that a fiber carrot formed during said spinning will have a minimum maintained viscosity of at least 2300 poises at spin reversal to produce as-spun carbon fibers having said ordered crystallite orientation and said longitudinal alignment.

4,504,455
CARBONACEOUS PITCH, PROCESS FOR THE PREPARATION THEREOF AND USE THEREOF TO MAKE CARBON FIBERS

Sugio Otani, Kiryu; Shimpei Gomi, Tokyo, and Fumio Mogi, Kiryu, all of Japan, assignors to Fuji Standard Research Inc., Tokyo, Japan

Filed Feb. 7, 1984, Ser. No. 577,695
Claims priority, application Japan, Feb. 8, 1983, 58-19168
Int. Cl.³ C10C 3/06, 3/08
U.S. Cl. 423—447.6 22 Claims

1. A reformed mesophase pitch obtained by heat-treating a dormant mesophase pitch which comprises dormant anisotropic components until a continuous phase of anisotropic domains is formed;

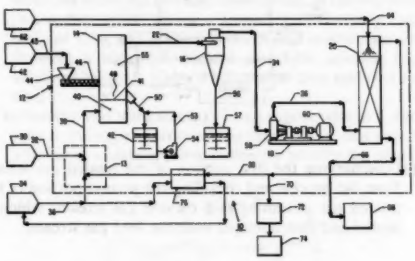
said dormant anisotropic components being partially hydrogenated, polycyclic polycondensed ring aromatic hydrocarbons derived from the mesophase of a mesophase pitch by hydrogenation of said mesophase and being soluble, in quinoline, and said dormant mesophase pitch being optically isotropic in nature but, upon being subjected to shear forces in one direction, capable of being oriented in said direction, and

said reformed mesophase pitch having a mesophase content MC of between 40 and 100% and a quinoline-insoluble content QI of between 5 and 70 weight %.

4,504,456
PROCESS AND APPARATUS FOR THE MANUFACTURE OF HYPROCHLOROUS ACID

Robert E. Yant, Medina, and Richard J. Galluch, Hudson, both of Ohio, assignors to Quantum Technologies, Inc., Twinsburg, Ohio

Filed Aug. 29, 1983, Ser. No. 527,000
Int. Cl.³ C01B 11/04
U.S. Cl. 423—473 11 Claims



1. A process of making hypochlorous acid solution comprising the steps of:

(a) reacting chlorine with steam to produce a gaseous admixture including hypochlorous acid and hydrochloric acid,

(b) delivering said gaseous admixture to a fluidized bed comprising a chloride forming base,

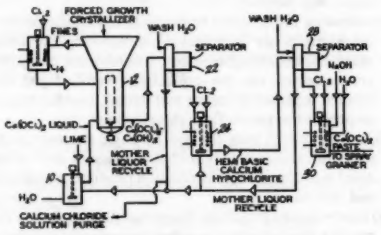
(c) passing said gaseous admixture through said bed to produce a solid-gas reaction stripping the hydrochloric acid vapor by conversion to a chloride salt and thereby forming a stripped reactant stream of hypochlorous acid vapor, and

(d) forming a solution from said hypochlorous acid vapor.

4,504,457
CONTINUOUS PROCESS FOR PRODUCING GRANULAR CALCIUM HYPOCHLORITE PARTICLES

Walter C. Saeman, Cleveland, Tenn., assignor to Olin Corporation, Cheshire, Conn.

Filed Sep. 30, 1982, Ser. No. 431,427
Int. Cl.³ B01D 1/20
U.S. Cl. 423—474 8 Claims



1. A continuous process for producing granular calcium hypochlorite particles which comprises:

(a) admixing lime and an aqueous liquid in a mixing zone to form a lime slurry;

(b) feeding said lime slurry to a crystallizing zone;

(c) feeding into said crystallizing zone a calcium hypochlorite-containing liquid to react with said lime to produce a slurry of coarse dibasic calcium hypochlorite crystals and to elutriate a fines slurry comprised of particles of calcium hydroxide from said crystallizing zone;

(d) conveying said fines slurry to a fines chlorinating zone;

(e) chlorinating said fines slurry to produce said calcium hypochlorite-containing liquid and returning said calcium hypochlorite-containing liquid to said crystallizing zone;
(f) separating said coarse dibasic calcium hypochlorite crystals from a dibasic hypochlorite mother liquor;
(g) reacting said coarse dibasic calcium hypochlorite crystals in a dibasic chlorinating zone with a chlorinating agent to produce a slurry of hemibasic calcium hypochlorite crystals;
(h) separating said hemibasic calcium hypochlorite crystals from a hemibasic hypochlorite mother liquor;
(i) reacting said hemibasic calcium hypochlorite crystals with chlorine in the presence of an aqueous alkali metal hydroxide solution to produce an aqueous paste of calcium hypochlorite dihydrate; and
(j) spraying said aqueous paste of calcium hypochlorite dihydrate into a heated zone to evaporate water and produce granular calcium hypochlorite particles.

4,504,458

GYPSUM CONVERSION

Knud C. B. Knudsen, Holte, Denmark, assignor to Superfos A/S, Vedbaek, Denmark

Filed Sep. 1, 1983, Ser. No. 528,712
Claims priority, application United Kingdom, Sep. 2, 1982, 8225006
Int. Cl.³ C22B *26/20, 26/10;* C01D *15/06*
U.S. Cl. 423—552 **4 Claims**

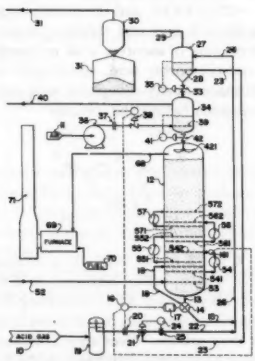
1. A process for converting calcium sulfate into potassium or sodium sulfate by ion exchange, comprising reacting at a pH between 0 and 4 an aqueous calcium sulfate slurry with an anion exchange resin initially loaded with chloride ion to form a calcium chloride solution and a sulfate loaded resin, regenerating the sulfate loaded resin by contacting it with a potassium chloride or sodium chloride solution to form a chloride loaded resin and a potassium sulfate or sodium sulfate solution.

4,504,459

EXTRACTION OF ELEMENTAL SULPHUR FROM SULPHUR COMPOUND GASES

William R. Stothers, 48 Woodbrook Rd. SW., Calgary, Alberta, Canada T2W 4M6

Filed Jul. 11, 1983, Ser. No. 512,554
Int. Cl.³ C01B *17/04;* B01J *8/12*
U.S. Cl. 423—573 G **15 Claims**



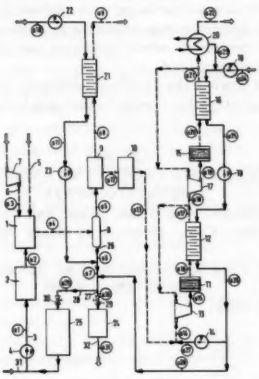
1. A process for the extraction of sulphur compound gases from a supply gas in the form of elemental sulphur, the process comprising forming a downwardly moving bed of catalyst in a container, introducing catalyst into the container at the top of the bed at a temperature less than the dew point of sulphur, withdrawing catalyst from the bottom of the bed, injecting the supply gas into the container at the bottom of the bed at a temperature higher than the boiling point of sulphur such that the gases at the top of the bed react on the catalyst to form elemental sulphur which condenses on the catalyst and such that the gases at the bottom of the bed vaporize and strip the condensed elemental sulphur from the catalyst, withdrawing from the container at a first withdrawal position and a second withdrawal position spaced along the height of the bed gases comprising less than the total flow of gases in the container, condensing and extracting elemental sulphur from said withdrawn gases and returning said gases to the bed at a first return position and a second return position, the container providing a path for flow of the bed of catalyst, which path is substantially free from valving arrangements restricting the flow of catalyst, wherein the first return position is downstream of the second withdrawal position and wherein the second withdrawal position is arranged relative to the first withdrawal position and first return position such that substantially the whole of the remainder of the gases not withdrawn at the first withdrawal position is withdrawn together with a proportion of the gases returned at said first return position.

4,504,460

METHOD AND PLANT FOR OBTAINING DEUTERIUM-ENRICHED WATER

Charles Mandrin, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Jul. 27, 1982, Ser. No. 402,226
Claims priority, application Switzerland, Jul. 30, 1981, 4929/81
Int. Cl.³ C01B *5/00*
U.S. Cl. 423—580 **8 Claims**



1. A method of obtaining deuterium-enriched water, said method comprising the steps of
supplying a synthesis gas plant over (n) successive operating periods with at least one hydrocarbon and an excess of water or steam to obtain a mixture of hydrogen, steam, carbon dioxide and residual components;
separating said mixture into a deuterium-enriched condensate consisting of waste water and a gas fraction containing hydrogen, steam, and residual components;
storing said condensate in a container in layers corresponding to the deuterium concentration;
supplying fresh water in excess to the synthesis gas plant during an initial operating period of said (n) operating periods;
supplying waste water from the poorest deuterium-containing layer in the container to the synthesis gas plant during subsequent operating periods of said (n) operating periods except for the last operating period;
supplying waste water from the container to a second con-

tainer during said last operating period for subsequent supply to a plant for obtaining heavy water;

delivering said gas fraction to at least one exchange stage;

bringing the hydrogen of said gas fraction into isotope exchange with additional water having a natural deuterium concentration in said exchange stage to deplete said gas fraction of deuterium while enriching the additional water with deuterium; and

storing the deuterium enriched water from said exchange stage for supply to the synthesis gas plant during (n−1) operating periods.

6. A plant for producing deuterium-enriched water comprising

a synthesis gas plant for producing a mixture of hydrogen, steam, carbon dioxide and residual components from water and at least one hydrocarbon;

a condenser for separating the mixture from said synthesis gas plant into a deuterium-enriched condensate consisting of waste water and a gas fraction containing hydrogen, steam and residual components;

a first container connected with said condenser to selectively receive successive charges of the condensate in layers from said separator, said container being connected at a lower end with said synthesis gas plant to selectively supply waste water to said synthesis gas plant;

means for selectively supplying fresh water to said synthesis gas plant during an initial operating period;

a second container connected with said condenser to selectively receive condensate from said separator in a last operating stage for subsequent supply to a plant for obtaining heavy water;

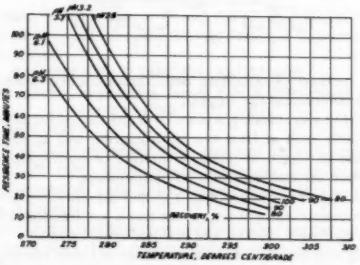
at least one exchange stage connected with said condenser for receiving and placing the gas fraction from said condenser in isotope exchange with additional water having a natural deuterium concentration to deplete said gas fraction of deuterium while enriching the additional water with deuterium; and

means for storing the enriched additional water from said exchange stage for supply to said synthesis gas plant.

4,504,461
PROCESS FOR PRODUCING AMMONIUM METATUNGSTATE

Kent H. Carpenter, Ann Arbor, Mich., and John M. Laferty, Wheat Ridge, Colo., assignors to Amax Inc., Greenwich, Conn.

Filed Sep. 2, 1983, Ser. No. 528,885
Int. Cl.[3] **C01G** *41/00*
U.S. Cl. 423—593 **14 Claims**



1. A process for producing ammonium metatungstate which comprises,

fluid bed roasting ammonium paratungstate at a temperature over the range of about 275° C. to 305° C. for a time inversely related to the temperature ranging from over about 10 minutes to about 2 hours and at least sufficient to provide a roasted product consisting essentially of an ammonium tungstate precursor of ammonium metatungstate capable of a conversion efficiency of over about 90% of said ammonium metatungstate,

forming an aqueous slurry of said precursor and digesting said precursor at a pH of about 3 to 4 for a time at least sufficient to effect substantially complete dissolution of said precursor,

filtering the digested slurry to produce a clear filtrate,

and further processing said filtrate by evaporation to provide crystals of substantially pure ammonium metatungstate at a conversion efficiency of over about 90%.

4,504,462
PROCESS FOR MAKING A LYOPHILIZED PRODUCT FOR USE IN SKELETAL IMAGING

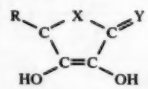
Barry F. Van Duzee, Westchester, and Charles R. Degenhardt, Cincinnati, both of Ohio, assignors to Mallinckrodt, Inc., St. Louis, Mo.

Filed Jun. 10, 1982, Ser. No. 387,136
Int. Cl.[3] **A61K** *43/00, 49/00*
U.S. Cl. 424—1.1 **10 Claims**

1. A process, for producing a dry-powder imaging composition, comprising the steps of:

(a) preparing a solution which comprises a diphosphonate carrier, stannous reductant, and a stabilizer in water, wherein said diphosphonate is selected from the group consisting of compounds and mixtures of compounds having the formula

wherein R_1 is hydrogen, alkyl containing from 1 to about 20 carbon atoms, amino alkyl, substituted amino alkyl, alkenyl containing from 2 to about 20 carbon atoms, aryl, phenylethenyl, benzyl, halogen, hydroxyl, amino, substituted amino —CH_2COOH, —$CH(COOH)CH_2COOH$, R_2 is hydrogen lower alkyl, amino, benzyl, halogen, hydroxyl, —CH_2COOH, and the pharmaceutically-acceptable salts thereof, and said stabilizer is selected from the group consisting of ascorbic acid, erythorbic acid, substituted 5-deoxyascorbic acid, substituted 6-deoxyascorbic acid, pharmaceutically-acceptable salts and esters thereof, and compounds having the formula



wherein X is CRR', O, NR', R' is hydrogen, or lower alkyl, Y is oxygen, sulfur, nitrogen, or CH_2, R is hydrogen, lower alkyl, lower alkyl containing from 3 to 8 carbon atoms substituted with one or more hydroxy, halogen, amino or thiol groups, lower alkyl containing from 1 to 8 carbon atoms halogen-substituted on the first and/or second carbon atom, alkenyl containing from 2 to about 8 carbon atoms, nicotinic acid and nicotinamide complexes thereof; and pharmaceutically-acceptable salts, esters, and amides, and mixtures thereof;

(b) adjusting said solution to a pH in the range from about 5.5 to about 6.5; and

(c) lyophilizing said solution.

4,504,463
PROCESS FOR MAKING A LYOPHILIZED PRODUCT FOR USE IN SKELETAL IMAGING

Barry F. Van Duzee, Cincinnati, Ohio, assignor to Mallinckrodt, Inc., St. Louis, Mo.

Filed Jun. 10, 1982, Ser. No. 387,139
Int. Cl.³ A61K *43/00, 49/00*
U.S. Cl. 424—1.1 **15 Claims**

1. A process, for producing a dry-powder composition, useful for skeletal imaging, comprising the steps of:

(a) preparing a solution which comprises a diphosphonate carrier, and stannous reductant, in water, wherein said diphosphonate is selected from the group consisting of compounds and mixtures of compounds having the formula

wherein R_1 is hydrogen, alkyl containing from 1 to about 20 carbon atoms, amino alkyl, substituted amino alkyl, alkenyl containing from 2 to about 20 carbon atoms, aryl phenylethenyl, benzyl, halogen hydroxyl, amino, substituted amino, $—CH_2COOH$, $—CH(COOH)CH_2COOH$, R_2 is hydrogen, lower alkyl amino, benzyl, halogen, hydroxyl, $—CH_2COOH$, and the pharmaceutically-acceptable salts thereof;

(b) adjusting said solution to a pH in the range from about 4.2 to about 4.8; and

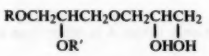
(c) lyophilizing said solution.

4,504,464
2,3-DIALKOXYPROPYL GLYCERYL ETHER AND ITS PREPARATION PROCESS AS WELL AS COSMETIC COMPOSITION CONTAINING SAME

Naotake Takaishi; Yoshiaki Inamoto, both of Utsunomiya; Kouichi Urata, Ichikai; Junichi Kawano, Sakura, and Hisao Tsutsumi, Miyashiro, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Jun. 24, 1982, Ser. No. 391,834
Claims priority, application Japan, Jul. 20, 1981, 56-113404
Int. Cl.³ A61K *7/021, 7/025*
U.S. Cl. 424—63 **9 Claims**

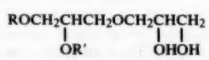
1. A 2,3-dialkoxypropyl glyceryl ether represented by the general formula (I):



(I)

wherein R denotes a saturated or unsaturated, straight chain or branched, aliphatic hydrocarbon group containing 8–24 carbon atoms, and R′ means a saturated or unsaturated, straight chain or branched, aliphatic hydrocarbon group containing 1–24 carbon atoms.

9. In a cosmetic composition, the improvement comprising 2,3-dialkoxypropyl glyceryl ether represented by the general formula (I):



(I)

wherein R denotes a saturated or unsaturated, straight chain or branched, aliphatic hydrocarbon group containing 8–24 carbon atoms, and R′ means a saturated or unsaturated, straight chain or branched, aliphatic hydrocarbon group containing 1–24 carbon atoms.

4,504,465
COSMETIC STICKS

Ronald L. Sampson, and David L. Shelton, both of Cincinnati, Ohio, assignors to The Proctor & Gamble Company, Cincinnati, Ohio

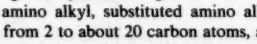
Continuation-in-part of Ser. No. 123,238, Feb. 21, 1980, abandoned, which is a continuation-in-part of Ser. No. 66,710, Aug. 15, 1979, abandoned. This application Jun. 30, 1980, Ser. No. 164,613
Int. Cl.³ A61K *7/32, 7/34, 7/36, 7/38*
U.S. Cl. 424—65 **10 Claims**

1. A cosmetic gel stick composition comprising:

A. from about 6% to about 70% of an aliphatic, polyhydric alcohol having from 2 to 3 carbon atoms and from 2 to 3 hydroxyl groups;

B. from about 3% to about 10% of a soap; and

C. from about 20% to about 80% of a condensation product having the formula



wherein R is selected from the group consisting of hydrogen and hydrocarbon chains having from about 2 to about 20 carbon atoms, a and b are each from about 0 to about 35 and a+b is from about 5 to about 35.

4,504,466
PERMANENT HAIR-WAVING

Tadaji Eda, 1-16A-208, Meguro 1 chome, Meguro-ku, Tokyo 153, Japan

Filed Jul. 10, 1980, Ser. No. 167,358
Int. Cl.³ A61K *7/09;* **A45D** *19/00*
U.S. Cl. 424—72 **22 Claims**

1. A one-step, permanent, hair-waving solution, which solution comprises in combination:

(a) a sulfur-sulfur reducing agent for cystine in an amount sufficient to reduce cystine and to form sulfur and a cysteine salt or cysteine, the agent selected from the group consisting of a sulfide, a hydrosulfide and a thioglycolate;

(b) a sulfite compound in an amount sufficient to act as an acceptor of the sulfur formed in the reaction of the cystine with the reducing agent and to form a thiosulfate, the molar ratio of sulfite compound to the reducing agent being 1.0 or more;

(c) an air-oxidation accelerator in an amount sufficient for fixing, by means of accelerated air oxidation, the recovered sulfur-sulfur link of the cystine;

(d) free alkali in an amount to provide a pH of from about 8 to 11 of the solution; and

(e) an aqueous carrier for the reducing agent, accelerator, sulfite compound and free alkali.

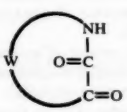
4,504,467
GLYCOPEPTIDE DERIVATIVES

R. Michael Molloy, Danville, and Manuel Debono, Indianapolis, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

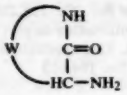
Filed Oct. 21, 1983, Ser. No. 544,339
Int. Cl.³ A01N *25/00;* **C07C** *103/52;* **A61K** *37/00*
U.S. Cl. 424—118 **21 Claims**

1. A process for preparing a compound of formula 1:

1



wherein W represents the remaining portion of a glycopeptide antibiotic of formula 2:



and the antibiotic is selected from A35512 factors A, B, C, E and H, A35512B pseudoaglycone, actaplanin factors A, B_1, B_2, B_3, C_{1a}, C_{2a}, C_3, D_1, D_2, E_1, G, K, L, M, N and O, actaplanin pseudoaglycone, A41030 factors A, B, C, D, E, F and G, A47934, ristocetin A and ristocetin A pseudoaglycone, which comprises reacting the antibiotic in a polar aprotic solvent in the presence of an oxidizing agent until the antibiotic is diaminated to give the formula 1 compound.

4,504,468

METHOD AND COMPOSITION FOR CONTROL OF TERMITE AND SHIPWORMS

Winston J. Brill, and William C. von Meyer, both of Madison, Wis., assignors to Agracetus, Middleton, Wis.

Filed Jul. 18, 1983, Ser. No. 514,936
Int. Cl.³ A01N *59/16*
U.S. Cl. 424—147 **13 Claims**

1. A method for specifically controlling termites and shipworms which comprises

treating cellulosic material with an effective amount of a soluble compound selected from the group consisting of sodium molybdate (Na_2MoO_4), molybdic anhydride (MoO_3), molybdic acid (H_2MoO_4), ferrous molybdate ($FeMoO_4$), sodium tungstate (Na_2WO_4), and diammonium molybdate ($(NH_4)_2Mo_2O_7$) in a dosage sufficient to be toxic to termites and shipworms; and

exposing the treated cellulosic material to the termites and shipworms to be controlled.

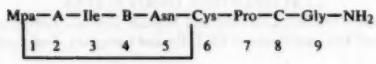
4,504,469

VASOTOCIN DERIVATIVES

Per O. R. Melin, Malmö, and Jerzy A. Trojnar, Vintrie, both of Sweden, assignors to Ferring AB, Malmö, Sweden

Filed Dec. 15, 1983, Ser. No. 561,920
Claims priority, application Sweden, Dec. 21, 1982, 8207277; May 3, 1983, 8302505
Int. Cl.³ A61K *37/00*; C07C *103/52*
U.S. Cl. 514—11 **9 Claims**

1. A vasotocin derivative having the formula



wherein

Mpa is a 3-merceptopropionoyl residue (—S—CH_2—CH$_2$—CO—);

A is the amino acid residue of L- or D-tyrosine-O-ethyl ether (L- or D-Tyr(Et)), or of a hydrophobic D-amino acid,

Ile is the amino acid residue of isoleucine;

B is the amino acid residue of glutamine (Gln), treonine (Thr) or valine (Val);

Asn is the amino acoid residue of asparagin;

Cys is the amino acid residue of cysteine;

Pro is the amino acid residue of proline;

C is the amino acid residue of L- or D-arginine (Arg), ornithine (Orn) or citrullin (Cit); and

Gly—NH_2 is the amino acid residue of glycine amide.

4,504,470

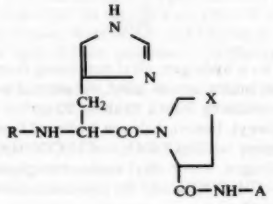
PHARMACEUTICAL PREPARATIONS CONTAINING TRH OR ITS ANALOGUE

Yoshiaki Uda, and Takatsuka Yashiki, both of Takarazuka, Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed May 12, 1982, Ser. No. 377,592
Claims priority, application Japan, May 14, 1981, 56/73293
Int. Cl.³ A61K *37/00*; C07C *103/52*
U.S. Cl. 514—19 **11 Claims**

1. A rectal dosage, nasal dosage, oral cavity dosage or oral dosage preparation form, containing

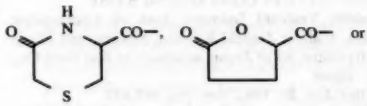
(A) L-pyroglutamyl-L-histidyl-L-prolinamide, its salt, its analogue represented by the formula:

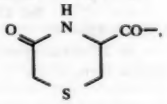


wherein

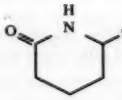
A is hydrogen, alkyl, aralkyl, alkoxyalkyl, hydroxyalkyl or alkoxy,

R is a group of the formula





provided that only when A is other than hydrogen may R be



and

X is —CH_2—, —CH_2CH_2— or —S—, or a salt of the analogue, and

(B) at least 1% by weight, based on the weight of the preparation, of an acid selected from the group consisting of a hydroxycarboxylic acid of 2 to 8 carbon atoms, a polycarboxylic acid of 2 to 8 carbon atoms and tropic acid,

said preparation having a pH of 2 to 6.

4,504,471
ANIMAL GROWTH PROMOTANT AND METHOD OF USE FOR ANIMAL GROWTH

Hirofumi Takagi; Kiyohiko Kunugita; Hideki Sawai, all of Sakura, and Kazuo Kariyone, Kyoto, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Filed Sep. 6, 1983, Ser. No. 529,680

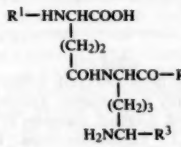
Claims priority, application United Kingdom, Sep. 27, 1982, 8227513

Int. Cl.³ A61K 37/02

U.S. Cl. 514—18 14 Claims

1. A growth promoting composition comprising:

(a) an acyl peptide of the formula or its non-toxic salt:



wherein

R^1 is lactoyl-alanyl-, R^2 is carboxymethylamino and R^3 is carboxy;

R^1 is heptanoyl, R^2 is 1-carboxyethylamino and R^3 is carboxy; or

R^1 is stearoyl, R^2 is 1-carboxyethylamino and R^3 is hydrogen, in an amount effective for promoting animal growth; and

(b) a suitable animal feed.

4,504,472
1,4-DIAMINOCYCLITOL DERIVATIVES

Takao Takaya, Kawanishi; Hideo Tsutsumi, Toyonaka; Nobuyuki Yasuda, Nishinomiya, and Keiji Matsuda, Takatsuki, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

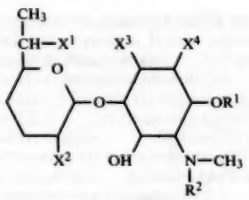
Filed Feb. 28, 1983, Ser. No. 470,449

Claims priority, application United Kingdom, Mar. 5, 1982, 8206609

Int. Cl.³ A61K 31/71; C07H 15/22

U.S. Cl. 514—36 18 Claims

1. A compound of the formula:



wherein X^1, X^2 and X^3 are each amino or protected amino,

X^4 is hydrogen or hydroxy,

R^1 is hydrogen or lower alkyl, and

R^2 is higher C_{10-24} alkanoyl or said alkanoyl substituted with hydroxy, amino, azido, epoxy, protected hydroxy or protected amino, higher C_{10-24} alkenoyl, or higher C_{10-24} alkylcarbamoyl, or pharmaceutically acceptable salt thereof.

18. A pharmaceutical antimicrobial composition comprising, as an active ingredient, the compound of claim 1, in association with a non-toxic, pharmaceutically acceptable carrier or excipient.

4,504,473
PYRIDINE SOLUBLE EXTRACT OF A MICROORGANISM

John L. Cantrell, Hamilton, Mont., assignor to Ribi Immuno-Chem Research, Inc., Hamilton, Mont.

Continuation of Ser. No. 393,823, Jun. 30, 1982, abandoned.

This application Apr. 17, 1984, Ser. No. 600,605

Int. Cl.³ A61K 35/78

U.S. Cl. 424—195.1 7 Claims

1. A pharmaceutical composition for treating tumors selected from the group of bovine squamous cell carcinoma, bovine fibrosarcoma, equine sarcoid, equine melanoma, equine squamous cell carcinoma, canine mammary tumors, canine adenoma and canine melanoma, comprising an anti-tumor effective amount of a combination of an effective amount of a purified pyridine-soluble extract obtained from a microorganism selected from the group consisting of *M. bovis* BCG, *M. phlei, M. smegmatis, M. kansasii, Nocardia rubra, Corynebacterium diphtheriae* and *Corynebacterium parvum,* said extract obtained by:

(a) preparing a whole cell paste of said microorganism;

(b) washing said paste;

(c) treating said paste with pyridine to produce an extract and a residue;

(d) removing said pyridine from said extract; and

(e) dialyzing said dried extract to obtain said purified pyridine-soluble extract, an effective amount of trehalose dimycolate; and an effective amount of an acetone precipitated by-product of endotoxic glycolipids extracted with chloroform methanol; and a pharmaceutically acceptable carrier.

4,504,474
SYNTHETIC PHOSPHOGLYCERIDES POSSESSING PLATELET ACTIVATING PROPERTIES

Donald J. Hanahan, and R. Neal Pinckard, both of San Antonio, Tex., assignors to Board of Regents, The University of Texas System, Austin, Tex.

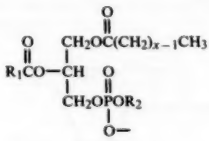
Division of Ser. No. 163,808, Jun. 27, 1980, Pat. No. 4,329,302.

This application Feb. 18, 1982, Ser. No. 349,699

Int. Cl.³ C07F 9/10; A61K 31/685

U.S. Cl. 514—78 2 Claims

1. A substantially pure glyceryl acyl phospholipid compound represented by the formula:

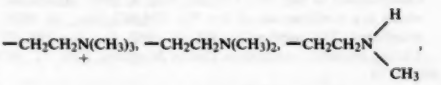


wherein

x denotes the integer 15 or 17;

R_1 is methyl, or ethyl; and

R_2 is an amine selected from the group consisting of



$-CH_2CH_2NH_2$ and pharmaceutically acceptable salts thereof.

4,504,475

3-(HALOETHYL)-4-OXOPYRAZOLO[5,1-d]-1,2,3,5-TETRAZINE-8-CARBOXAMIDE COMPOUNDS

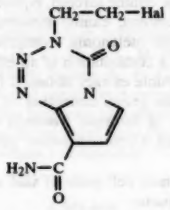
Chia C. Cheng, Leawood, Kans., assignor to Warner Lambert Company, Ann Arbor, Mich.

Filed May 24, 1983, Ser. No. 497,587

Int. Cl.³ C07D *257/08;* **A01N** *43/64*

U.S. Cl. 514—413 **10 Claims**

1. 3-(2-Haloethyl)-4-oxopyrazolo[5,1-d]-1,2,3,5-tetrazine-8-carboxamide compounds having the structural formula:



where Hal is a halogen.

9. A method for treating leukemia in a mammal which comprises administering a dosage form containing a leukemia-inhibiting amount of compound having the structural formula according to claim **1**, in combination with a pharmaceutically acceptable carrier, to a mammal in need thereof.

4,504,476

METHOD OF ADMINISTERING CALCIUM CHANNEL BLOCKING AGENTS

Arnold Schwartz; Ingrid L. Grupp; Gunter Grupp, all of University of Cincinnati, College of Medicine, 231 Bethesda Ave., Cincinnati, Ohio 45267, and Alain de Pover, Klingentalgraben 7, 4057 Baesel, Switzerland

Filed Sep. 16, 1983, Ser. No. 532,662

Int. Cl.³ A61K *31/33, 31/44*

U.S. Cl. 514—211 **8 Claims**

1. A method of stimulating the binding of a dihydropyridine derivative to cardiac tissue, which comprises administering d-cis-diltiazem in combination with a dihydropyridine derivative, said d-cis-diltiazem being administered at a submicromolar concentration insufficient to cause substantial decrease in contractility.

4,504,477

CEPHALOSPORIN ANTIBIOTICS

Cynthia H. O'Callaghan, Gerrards Cross; Barry E. Ayres, Ickenham; David G. H. Livermore, Princes Risborough; Christopher E. Newall, London, and Niall G. Weir, Wembley, all of England, assignors to Glaxo Group Limited, London, England

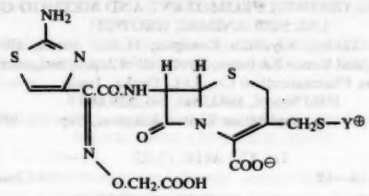
Continuation of Ser. No. 176,536, Aug. 8, 1980, abandoned, which is a continuation of Ser. No. 095,062, Nov. 16, 1979, abandoned. This application Jul. 21, 1981, Ser. No. 285,492

Claims priority, application United Kingdom, Nov. 17, 1978, 44873/78

Int. Cl.³ C07D *501/36;* **A61K** *31/545*

U.S. Cl. 514—203 **10 Claims**

1. A cephalosporin antibiotic of formula



(I)

(wherein $Y^{\oplus}$ represents a C-attached 1-C_{1-4} alkylpyridinium group) and non-toxic salts, non toxic metabolically labile esters and 1-oxides thereof.

4,504,478

CEPHALOSPORIN-1-OXIDE DERIVATIVES

Frederic H. Jung, Rilly la Montague, France, and Gareth M. Davies, Macclesfield, England, assignors to Imperial Chemical Industries PLC, Enghine-les-Bains, France and ICI Pharma, London, England

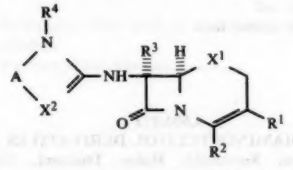
Filed Sep. 7, 1982, Ser. No. 415,541

Claims priority, application European Pat. Off., Sep. 18, 1982, 81401458.5

Int. Cl.³ A61K *31/545;* **C07D** *501/18*

U.S. Cl. 514—202 **5 Claims**

1. A cephalosporin derivative of the formula I:



I

wherein X^1 is sulphinyl in which oxygen is in the β-configuration; R^2 is carboxy; X^2 is nitrogen; R^3 is hydrogen; A is of the formula II:

II

in which R^6 and R^7 are hydrogen; R^4 is hydrogen; and R^1 is hydrogen, chlorine, methyl, acetoxymethyl, 1-methyl-1H-tetrazol-5-ylthiomethyl, 1-carboxymethyl-1H-tetrazol-5-ylthiomethyl, 1-(2-dimethylamino)ethyl-1H-tetrazol-5-ylthiomethyl, 1-sulphomethyl-1H-tetrazol-5-ylthiomethyl, 1-isopropyl-1H-tetrazol-5-ylthiomethyl, 1-(2,2,2-trifluoro)ethyl-1H-tetrazol-5-ylthiomethyl, 1-phenyl-1H-tetrazol-5-ylthiomethyl, 1-(2-methylthio)ethyl-1H-tetrazol-5-ylthiomethyl, 1,3,4-thiadiazol-2-ylthiomethyl, 5-methyl-1,3,4-thiadiazol-2-ylthiomethyl, 1,2,3-thiadiazol-5-ylthiomethyl, 1H-1,2,3,-triazol-4-ylthiomethyl, 5-trifluoromethyl-1H-1,2,4-triazol-3-ylthiomethyl, 4,6-dimethylpyrimid-2-ylthiomethyl, 2-thiazolin-2-ylthiomethyl, benzoxazol-2-ylthiomethyl, benzthiazol-2-ylthiomethyl, 2-carboxyphenylthiomethyl, (6-carboxymethyl-7-hydroxypyrrolo[1,2-b]pyridazin-2-yl)thiomethyl, methoxymethyl, hydroxymethyl, azidomethyl, aminomethyl, benzoyloxymethyl, acetylaminomethyl, carbamoyloxymethyl, 2-methylthio-1,3,4-thiadiazol-5-ylthiomethyl, 2-mercapto-1,3,4-thiadiazol-5-ylthiomethyl, 2-acetylamino-1,3,4-thiadiazol-5-ylthiomethyl, 5-methyl-1,2,4-thiadiazol-2-ylthiomethyl, 2-sulphomethyl-1,2,4-oxadiazol-5-ylthiomethyl, 4-methyl-5-(3-carboxypropyl)thiazol-2-ylthiomethyl, 2H-2-methyl-1,2,3-triazol-4-ylthiomethyl, 1H-1,2,4-triazol-2-ylthi-

omethyl, 4,5-dihydro-6-hydroxy-4-methyl-5-oxo-1,2,4-triazin-3-ylthiomethyl, 2,5-dihydro-6-hydroxy-2-methyl-5-oxo-1,2,4-triazin-3-ylthiomethyl, 1-oxidopyrid-2-ylthiomethyl, imidazo[4,5-b]pyrid-2-ylthiomethyl or imidazo[4,5-b]-pyrimidin-2-ylthiomethyl, or the pharmaceutically-acceptable acid- or base- addition salts thereof.

4. A pharmaceutical composition which comprises an antibacterially-effective amount of a cephalosporin derivative as claimed in claim **1** in association with a pharmaceutically-acceptable diluent or carrier.

4,504,479

6-{5-[ω-(1-IMIDAZOLYL)-ALKYL]-THIEN-2-yl}-3-OXO-2,3,4,5-TETRAHYDRO-PYRIDAZINES AND ACID ADDITION SALTS THEREOF AND A PROCESS FOR THE TREATMENT OF INFLAMMATORY ATHEROSCLEROTIC AND THROMBO-EMBOLIC, ILLNESSES IN HUMANS

Hans-Heiner Lautenschläger, Pulheim-Stommeln; Gerd Hilboll, Cologne; Hugo Friehe, Erftstadt-Lechenich, and Josef P. Löhr, Hilden, all of Fed. Rep. of Germany, assignors to A. Nattermann & Cie GmbH, Cologne, Fed. Rep. of Germany

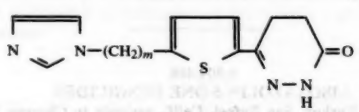
Filed Jul. 12, 1982, Ser. No. 397,090

Claims priority, application Fed. Rep. of Germany, Jul. 31, 1981, 3130252

Int. Cl.[3] **C07D** *237/06;* **A61K** *31/50*

U.S. Cl. 514—252 **15 Claims**

1. 6-{5-[ω-(1-Imidazolyl)-alkyl]-thien-2-yl}-3-oxo-2,3,4,5-tetrahydro-pyridazines of the formula I



I

in which m denotes an integer from 1 to 12, and pharmaceutically acceptable acid addition salts thereof with inorganic or organic acids.

4,504,480

PENTACYCLIC COMPOUNDS

Laramie M. Gaster, Bishop's Stortford, and Barry S. Orlek, London, both of England, assignors to Beecham Group p.l.c., Brentford, England

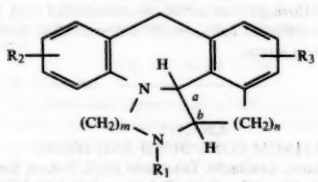
Filed Mar. 4, 1983, Ser. No. 472,218

Claims priority, application United Kingdom, Mar. 5, 1982, 8206558

Int. Cl.[3] **A61K** *31/495;* **C07D** *223/14*

U.S. Cl. 514—214 **12 Claims**

1. A compound of formula (I),



(I)

or an N-oxide or pharmaceutically acceptable salt thereof, wherein R_1 is hydrogen, C_{1-7} alkyl, C_{3-7} cycloalkyl, C_{4-7} cycloalkenyl or C_{1-4} alkyl substituted by C_{2-7} alkenyl, C_{2-7} alkynyl, C_{3-7} cycloalkyl, hydroxy, thiol, C_{1-4} alkoxy, C_{1-4} alkylthio, carboxy, C_{1-4} alkoxycarbonyl, C_{1-4} alkanoyl, amino optionally substituted by one or two C_{1-4} alkyls or by C_{4-6} polymethylene optionally having an oxygen or nitrogen atom, aminocarbonyl optionally N-substituted by one or two C_{1-4} alkyls, or benzoyl or phenyl either being optionally ring-substituted by C_{1-4} alkyl, C_{1-4} alkoxy, halogen or trifluoromethyl, R_2 and R_3 are the same or different and are hydrogen, hydroxy, C_{1-4} alkyl, C_{1-4} alkoxy, C_{1-4} alkylthio, halogen or trifluoromethyl, m is 2 and n is 1 or 2, the hydrogen atom bonded to the C_a carbon atom being trans to the hydrogen atom bonded to the C_b carbon atom.

11. A pharmaceutical composition, which comprises a compound of formula (I), as defined in any one of claims **1** to **10**, or an N-oxide or pharmaceutically acceptable salt thereof, and a pharmaceutically acceptable carrier.

4,504,481

BENZHYDRYLPIPERAZINE DERIVATIVES, PROCESS FOR THEIR PREPARATION AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

Edit Tóth; Jozsef Torley; Eva Pálosi; Szabolcs Szeberenyi; Laszlo Szporny; Sándor Görög, and István Hajdu, all of Budapest, Hungary, assignors to Richter Gedeon Vegyeszeti Gyar Rt., Budapest, Hungary

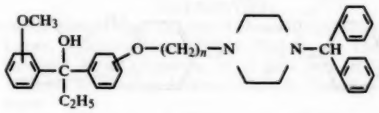
Filed Dec. 27, 1983, Ser. No. 565,923

Claims priority, application Hungary, Dec. 28, 1982, 4187/82

Int. Cl.[3] **A61K** *31/495;* **C07D** *295/02*

U.S. Cl. 514—255 **4 Claims**

1. A benzhydryl-piperazine compound of the formula (I)



(I)

wherein n is 2 or 3, or an acid addition salt thereof.

4. A method of inducing the polysubstrate liver microsomal monooxygenase system of a susceptible subject which comprises administering an effective amount of a compound as defined in claim **1**.

4,504,482

[5(OR 4)-(PYRIDINYL)-2-PYRIMIDINYL]UREAS AND CARDIOTONIC USE THEREOF

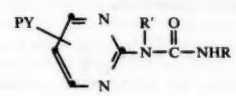
George Y. Lesher, Schodack, and Baldev Singh, East Greenbush, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Filed Jul. 28, 1983, Ser. No. 518,280

Int. Cl.[3] **A61K** *31/505;* **C07D** *401/04*

U.S. Cl. 514—275 **8 Claims**

1. An N—R—N′—R′—N′—[4-(or 5)-PY-2-pyrimidinyl]urea having the formula



or acid-addition salt thereof, where PY is 4- or 3-pyridinyl or 4- or 3-pyridinyl having one or two lower-alkyl substituents, R′ is hydrogen or methyl and R is methyl or ethyl when PY is attached to the 4-position of the pyrimidine ring or R is hydrogen, ethyl or n-butyl when PY is attached to the 5-position of the pyrimidine ring.

8. The method for increasing cardiac contractility in a patient requiring such treatment which comprises administering orally or parenterally in a solid or liquid dosage form to such patient a cardiotonically effective amount of N—R—N′—R′—N′—[4(or 5)-PY-2-pyrimidinyl]urea according to claim **1** or pharmaceutically acceptable acid-addition salt thereof.

4,504,483

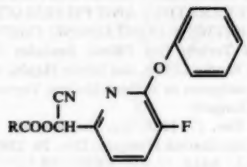
FLUORINE SUBSTITUTED PYRIDINE METHYL ESTERS AND INSECTICIDAL AND ACARICIDAL COMPOSITIONS THEREOF

Kiyomi Ozawa; Masataka Hatanaka, both of Funabashi; Masayoshi Hirose, and Masaki Kudo, both of Shiraoka, all of Japan, assignors to Nissan Chemical Industries Ltd., Tokyo, Japan

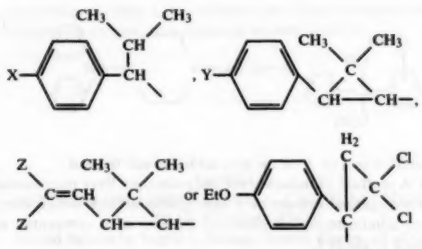
Filed Aug. 17, 1982, Ser. No. 408,912
Claims priority, application Japan, Aug. 25, 1981, 56-132856
Int. Cl.³ C07D *213/64*
U.S. Cl. 514—351 **11 Claims**

1. Fluorine substituted pyridine methyl esters having the formula

(I)



wherein R represents



in which X is chlorine or difluoromethoxy; Y is chlorine or tert-butyl; and Z is a halogen atom.

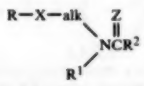
4,504,484

CERTAIN N,N-DI-SUBSTITUTED-PYRIDINE CARBOXAMIDES, FUNGICIDAL COMPOSITIONS AND FUNGICIDAL METHOD OF USE

David M. Spatz, Fairfax, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Nov. 4, 1982, Ser. No. 439,243
Int. Cl.³ C07D *213/56*; A61K *31/455*
U.S. Cl. 514—357 **38 Claims**

1. A compound of the formula:



wherein R is phenyl, or phenyl substituted with 1 to 3 substituents independently selected from fluoro, chloro, bromo, iodo, nitro, lower alkyl, lower alkoxy, lower alkyl or lower alkoxy substituted with 1 to 3 of the same or different halogens; R^1 is lower alkyl, or $-CH_2Y$ wherein Y is lower alkenyl, lower alkenyl substituted with 1 to 3 of the same or different halogens, lower alkynyl, lower alkynyl substituted with 1 to 3 of the same or different halogens, lower alkoxyalkyl, lower alkoxy, lower alkylthioalkyl, lower thioalkyl, lower hydroxyalkyl, lower haloalkyl, or halogen; R^2 is pyridyl or pyridyl substituted with 1 to 2 independent lower alkyl groups, with the proviso that the nitrogen of the pyridyl ring is not bonded to the

group; Z is sulfur, or oxygen; X is sulfur, oxygen, or represents a direct linkage between R and alk; and alk is a branched- or straight-chain alkylene group of 1 to 10 carbons with the proviso that the chain length is no longer than 5 carbons.

32. A method for controlling fungi comprising contacting said fungi or their growth environment with a fungicidally effective amount of a compound of the formula defined in claim 1.

4,504,485

5R,6S,8R-6-(1-HYDROXYETHYL)-2-(2-CARBAMOYLOXYETHYLTHIO)-PENEM-3-CARBOXYLIC ACID

Stuart W. McCombie, West Orange; Ashit K. Ganguly, Upper Montclair, and Viyyoor M. Girijavallabhan, Parsippany, all of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Filed Apr. 4, 1983, Ser. No. 481,551
Int. Cl.³ C07D *499/00*; A61K *31/425*
U.S. Cl. 514—192 **7 Claims**

1. 5R,6S,8R-6-(1-hydroxyethyl)-2-(2-carbamoyloxyethylthio)penem-3-carboxylic acid and the pharmaceutically acceptable salts and metabolizable esters thereof.

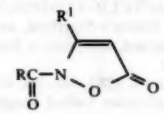
4,504,486

3-ISOXAZOLIN-5-ONE FUNGICIDES

Victor P. Kurkov, San Rafael, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed May 17, 1982, Ser. No. 379,388
Int. Cl.³ C07D *261/12*
U.S. Cl. 514—380 **9 Claims**

1. A compound of the formula



wherein R is phenyl or phenyl substituted with 1 to 3 of the same or different substituents selected from fluoro, chloro, bromo, iodo, nitro, lower alkyl having 1 through 6 carbon atoms, lower alkoxy having 1 through 6 carbon atoms or lower alkyl, having 1 through 6 carbon atoms, substituted with 1 to 3 of the same or different halogens; R^1 is lower alkyl having 1 through 6 carbon atoms.

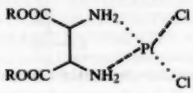
4,504,487

PLATINUM COMPOUND AND DRUG

Chikao Yoshikumi, Kunitachi; Takayoshi Fujii, Tokyo; Kenichi Saito, Tokyo; Masahiko Fujii, Tokyo, and Koichi Niimura, Sayama, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 265,838, May 21, 1981, Pat. No. 4,372,890.
This application Sep. 30, 1982, Ser. No. 431,374
Claims priority, application Japan, Jun. 11, 1980, 55-78783
Int. Cl.³ A61K *31/28*
U.S. Cl. 514—492 **8 Claims**

1. A drug comprising 0.001–85 wt. % of the drug of a platinum compound having the formula



wherein R is hydrogen atom, an alkali metal atom or a lower alkyl group, as an active ingredient, and a pharmacologically acceptable carrier.

4,504,488

PESTICIDAL VINYL-TIN COMPOUNDS

Royston H. Davis, Sittingbourne, England, assignor to Shell Oil Company, Houston, Tex.

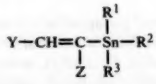
Filed Dec. 14, 1982, Ser. No. 449,808

Claims priority, application United Kingdom, Dec. 31, 1981, 8139158

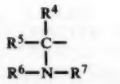
Int. Cl.³ A01N *55/04;* **A61K** *31/28;* **C07F** *7/22*

U.S. Cl. 514—493 **2 Claims**

1. A compound of the formula



wherein each of R^1, R^2 and R^3 is alkyl of 1 to 6 carbon atoms; one of Y and Z is hydrogen and the other is a group of the formula:



in which each of R^4 and R^5 is hydrogen or alkyl of 1 to 6 carbon atoms or R^4 and R^5 together with the interjacent atom form a saturated unsubsituted carbocylic ring of 5 to 8 carbon atoms, and each of R^6 and R^7 is hydrogen or alkyl of 1 to 4 carbon atoms, and acid addition salts thereof.

4,504,489

USE OF CERTAIN VINYL-TIN COMPOUNDS AS INSECTICIDES

Royston H. Davis, Sittingbourne, England; Mark E. Schroeder, Modesto, Calif., and Terence N. Mitchell, Dortmund 76, Fed. Rep. of Germany, assignors to Shell Oil Company, Houston, Tex.

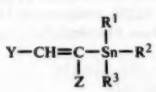
Filed Dec. 27, 1982, Ser. No. 453,549

Claims priority, application United Kingdom, Dec. 31, 1981, 8139159

Int. Cl.³ A01N *55/04*

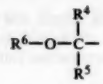
U.S. Cl. 514—493 **4 Claims**

1. An insecticidal composition which comprises an agricultural carrier, a surface-active agent, and an insecticidal amount of a compound of the formula:



(I)

wherein each of R^1, R^2 and R^3 independently is alkyl of one to eight carbon atoms; one of Y and Z is hydrogen, or alkyl of one to four carbon atoms, and the other is a group of Formula II:



(II)

in which each of R^4 and R^5 independently is hydrogen, or alkyl or alkoxy of one to eight carbon atoms, or R^4 and R^5 together with the interjacent carbon atom form a cycloalkyl ring of from five to eight carbon atoms; R^6 is hydrogen, alkyl of from one to four carbon atoms, alkylcarbonyl having up to four carbon atoms in the alkyl group or benzoyl.

4,504,490

SUBSTITUTED BENZENESULFONIC ESTERS AND THEIR USE AS MEDICAMENTS FOR COMBATTING HELMINTHS

Manfred Rösner, Eppstein; Josef Urbanietz, Schwalbach; Heinz Loewe, Kelkheim; Dieter Düwel, Hofheim am Taunus, and Reinhard Kirsch, Eppstein, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

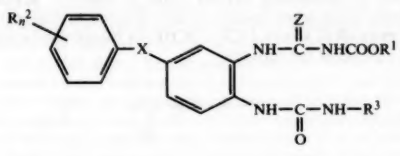
Filed Sep. 2, 1983, Ser. No. 528,842

Claims priority, application Fed. Rep. of Germany, Sep. 4, 1982, 3232959

Int. Cl.³ A61K *31/27;* **C07C** *143/68*

U.S. Cl. 514—483 **5 Claims**

1. A benzenesulfonic ester of the formula I



I

in which

R^1 denotes straight-chain or branched alkyl having 1–4 carbon atoms, n denotes 1, 2 or 3 and the individual substituents R^2, independently of one another, denote hydrogen, fluorine, chlorine, bromine, iodine, cyano, nitro, trifluoromethyl, 1,1,2,2-tetrafluoroethoxy, straight-chain or branched alkyl having 1–12 carbon atoms, cycloalkyl having 3–8 carbon atoms, alkoxy, alkylthio, alkylsulfinyl or alkylsulfonyl, each having 1–6 carbon atoms in the alkyl radical, acetyl, acetamino, or phenyl, phenoxy, phenylthio, phenylsulfinyl or phenylsulfonyl, each of which is optionally substituted once or twice by halogen, R^3 denotes hydrogen or —CO—R^4, in which R^4 denotes alkyl or alkoxyalkyl which are optionally substituted by halogen, and each of which have 1–6 carbon atoms in an alkyl moiety, or phenyl which is optionally substituted by halogen, methyl or methoxy,

X denotes $—SO_2—O—$ or $—O—SO_2—$ and

Z denotes =S; =N—$COOR^1$ or =NH.

4. Method of combatting helminths by administering to the patient a sufficient amount of a substituted benzenesulfonic ester of the formula I in claim 1.

4,504,491

PESTICIDES

Michael Elliott, Stevenage; Norman F. Janes, Luton, and Bhyp inder P. S. Khambay, Harrow Weald, all of England, assignors to National Research Development Corporation, London, England

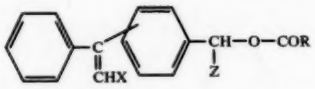
Filed Jul. 6, 1982, Ser. No. 395,295

Claims priority, application United Kingdom, Jul. 10, 1981, 8121330

Int. Cl.³ A01N *37/34, 37/00;* **C07C** *121/50*

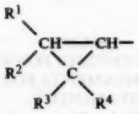
U.S. Cl. 514—521 **7 Claims**

1. A compound of the general formula:



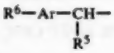
I

wherein X represents hydrogen, halogeno or an alkyl group, Z represents hydrogen, an alkyl group or a cyano or ethynyl group and R represents a group of the formula:



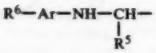
II

wherein R^1 represents hydrogen or a substituted or unsubstituted acyclic or carbocyclic group, R^2 represents hydrogen or an alkyl group and R^3 and R^4 each represent an alkyl group; or a group of formula:



III

wherein Ar represents an aryl residue, R^5 represents a saturated or unsaturated straight chain or branched acyclic or cyclic hydrocarbon residue and R^6 represents hydrogen or one or more alkyl, alkoxy, OCF_3, $OCHF_2$ or halogeno substituents; or a group of the formula:



wherein R^5, R^6 and Ar are as defined above.

4,504,492

PHARMACEUTICAL AMIDES, AND PREPARATION, FORMULATIONS AND USE THEREOF

Samuel Wilkinson, Beckenham, and George W. Hardy, Biggin Hill, both of England, assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

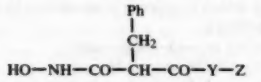
Filed Sep. 24, 1982, Ser. No. 422,997

Claims priority, application United Kingdom, Sep. 25, 1981, 8129053

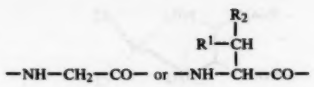
Int. Cl.³ A61K *31/275, 31/215, 31/195;* **C07C** *101/24*

U.S. Cl. 514—522 **13 Claims**

1. Compounds of the formula

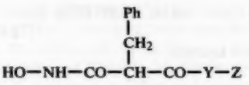


wherein Ph is phenyl substituted in the 4-position by isopropyl, methoxy, nitro or bromo; Y is a group of formula



where R^1 is hydrogen or methyl; R^2 is alkyl of 1 to 3 carbon atoms or is methylthiomethyl; and Z is $—OR^3$ or $—NR^4R^5$ where R^4 and R^5 are each hydrogen or alkyl of 1 to 4 carbon atoms and R^3 is hydrogen, alkyl of 1 to 4 carbon atoms, phenyl alkyl of 1 to 4 carbon atoms in the alkylene moiety thereof, or phenyl and basic salts thereof.

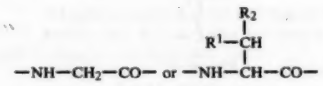
13. A method for the prolongation and/or potentiation in a mammal, of the effects of endogenous or exogenous enkephalins, comprising administration to the mammal of a non-toxic, therapeutically effective amount of a compound of formula (1),



(1)

wherein Ph is a phenyl group which is optionally substituted by one or more substituents selected from halo (ie fluoro, chloro, bromo or iodo), C_{1-4} alkyl, amino, C_{1-4} alkylamino, di-C_{1-4}alkylamino, nitro, sulphonyl, aminosulphonyl, trihalomethyl, carboxy, C_{1-4}alkoxycarbonyl, amido, C_{1-4}alkylamido, C_{1-4}alkoxy, C_{2-4}alkenyl, cyano, aminomethyl or methylsulphonyl;

Y is a group formula



where R^1 is hydrogen or methyl;

R^2 is alkyl of 1 to 3 carbon atoms or is methylthiomethyl; and

Z is $—OR^3$ or $—NR^4R^5$ where R^3, R^4 and R^5 are each hydrogen or alkyl of 1 to 4 carbon atoms and R^3 can further be phenylalkyl having 1 to 3 atoms in the alkylene moiety thereof, or phenyl or a pharmacologically and pharmaceutically acceptable basic salt thereof.

4,504,493

SOLUTION FOR SURGICAL IRRIGATION

G. June Marshall, Los Angeles, Calif., and Stephen J. Snyder, 19525 Shirley Ct., Tarzana, Calif. 91356, assignors to University of Southern California by G. June Marshall, Los Angeles, Calif., a part interest

Filed Jul. 15, 1983, Ser. No. 514,224

Int. Cl.³ A61K *31/045*

U.S. Cl. 514—738 **7 Claims**

1. In a method of performing surgery on a body portion, the step of irrigating the surgical field with an essentially isotonic, non-electrolytic and optically clear solution of glycerol and water.

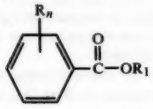
4,504,494

PREPARATION OF ANTHRALIN SOLUTIONS OR SUSPENSIONS IN AROMATIC ESTERS AND THEIR USE FOR DISEASES OF THE SKIN AND NAILS

Jean F. Grollier, Paris; Georges Rosenbaum, Asnieres; Josiane Allec, Pierrefitte, and Braham Shroot, Antibes, all of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France

Filed Jan. 20, 1983, Ser. No. 459,647
Claims priority, application France, Jan. 28, 1982, 82 01327
The portion of the term of this patent subsequent to Jan. 22, 2002, has been disclaimed.
Int. Cl.³ A61K 31/05
U.S. Cl. 514—544 7 Claims

1. An oxidation stable composition for the treatment of skin diseases, comprising a solution or dispersion containing 0.01 to 5% by weight of anthralin in an aromatic ester of the formula:



wherein

R represents H, OH, CH_3, or OCH_3,

n is 1 or 2; and

R_1 represents phenyl, (C_1–C_3) alkyl phenyl, or benzyl.

4,504,495

PROCESS FOR THE CONTROL OF CHALKBROOD DISEASE IN LEAFCUTTER BEES

Lawrence C. Keltner, Cabin Creek Rte., Ismay, Mont. 59336

Filed Feb. 24, 1984, Ser. No. 583,381
Int. Cl.³ A01N 37/00, 37/08
U.S. Cl. 514—760 4 Claims

1. A process for controlling chalkbrood disease in leafcutter bees, comprising the step of:

fumigating the larva stage of the leafcutter bee with an amount of methyl bromide effective against the fungus Ascosphaera sp.

4,504,496

PROCESS FOR IMPROVING THE FLAVOR AND/OR THE MOUSSEUX OF SPARKLING WINES AND SPARKLING WINES PRODUCED ACCORDING TO SAID PROCESS

Emil E. J. Underberg, Dietlikon, Switzerland, and Andreas F. Lembke, Eutin-Sielbeck, Fed. Rep. of Germany, assignors to Underberg-Handels AG., Dietlikon, Switzerland

Continuation of Ser. No. 925,669, Jul. 18, 1978, abandoned. This application Jan. 25, 1980, Ser. No. 115,575
Claims priority, application Switzerland, Jul. 19, 1977, 8945/77
Int. Cl.³ C12C 11/00
U.S. Cl. 426—11 17 Claims

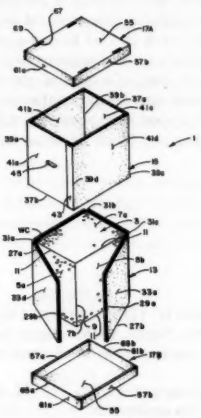
1. A process for improving the flavor and the mousseux of sparkling wines containing a permanent visible excess of carbon dioxide, in which after the alcoholic fermentation step in the preparation of the sparkling wine there is added a mixture of two components: (1) a product which comprises at least one amino acid or amino acid derivative, and (2) either one or both of thiamine and thiamine pyrophosphoric acid salt.

4,504,497

CARTON FOR PACKAGING A SEMI-SOLID BULK FORM

Charles W. Kurth, and John M. Moerchen, both of Ozaukee County, Wis., assignors to Alton Packaging Corporation, Alton, Ill.

Filed Aug. 15, 1983, Ser. No. 523,010
Int. Cl.³ B65D 5/68, 85/72, 85/76, 5/00
U.S. Cl. 426—130 1 Claim



1. A carton containing a bulk quantity of a semi-solid block of unhardened cheese which tends to remain semi-fluid and tending to bulge during packaging, but capable of being formed into the desired block form, said block having a plurality of side faces, a pluarality of corners between said side faces, and a pair of generally parallel end faces, said carton comprising a one-piece wrapper of multi-layered sheet of corrugated boxboard material comprising at least two layers of corrugations and an outer face sheet and an inner face sheet, said wrapper being folded on itself, so as to form side panels which are in face-to-face engagement with said side faces of said block during packaging and wherein each side panel has substantially the same cross section as each side face of the block, an open-ended sleeve having a cross section similar to said block and further having a side face for each of the side panels of said wrapper and corresponding to each side face of said block, said sleeve being formed of multi-layered sheet of corrugated boxboard material, being foldable on itself so as to be in said face-to-face engagement with the side panels of said wrapper, said sleeve being telescopically received over said wrapper, with the side faces of said sleeve being in face-to-face sliding engagement with the side panels of said wrapper to securely hold the side panels of said wrapper in engagement with the side faces of said block, and with both said sleeve and said wrapper cooperatively holding said semi-solid material in its desired block form, said one-piece sheet formed wrapper being slit-scored along a plurality of lines extending perpendicularly between the top and bottom of the wrapper and with the slit-score lines constituting a slit or cut made through said outer face sheet and through one or more layers of said corrugations of said one piece wrapper such that said wrapper is folded on itself away from the slit score along said lines with the face sheet of the wrapper constituting said inner face sheet forming hinges along which the portions of said wrapper constituting said wrapper panels may be folded to relatively sharp corners as formed by said hinge between said adjacent wrapper panels, said wrapper panels being in face-to-face relation with said respective side faces of said block and said hinges receiving a respective corner of said block, the open ended sleeve formed of said sheet of corrugated boxboard material having a cross section similar to said block and having a face for each corresponding side face of said block, said

sleeve being telescopically received over said wrapper with the faces of said sleeve being in tight, slidable face-to-face relation with the respective panels of said wrapper so as to positively hold said wrapper panels in tight face-to-face relation with the respective side faces of said block, said sleeve formed of a sheet of corrugated boxboard material being slit-scored along a plurality of lines so as to form corners thereof, and which corners being substantially aligned for corresponding with the formed corners of the intermediately arranged wrapper, an overfitting telescopic lid applied to each open end of such sleeve, each said lid having a planar panel in face-to-face engagement with a contiguous end face of said block, and each lid being formed of a sheet of corrugated boxboard material and foldable into the lid configuration to provide for its said application upon each open end of the combined wrapper and sleeve, and the block of unhardened cheese contained therein.

4,504,498

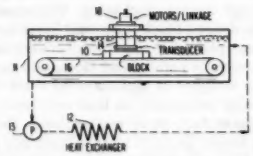
ACOUSTIC THAWING OF FROZEN FOOD

Allan D. Kissam, Sandy, Utah, assignor to The United States of America as represented by the Secretary of Commerce, Washington, D.C.

Continuation-in-part of Ser. No. 370,772, Apr. 22, 1982, Pat. No. 4,464,401. This application Apr. 16, 1984, Ser. No. 600,859

Int. Cl.[3] **A23L** *3/30*

U.S. Cl. 426—238 **4 Claims**



1. A method of thawing frozen food, comprising:

immersing the frozen food in a liquid bath having a temperature in the range of about 1°–250° C., and

irradiating the frozen food in the liquid bath with sound having a frequency in the relaxation frequency spectrum of the ice crystals in the frozen food and a sound pressure level in the range of about 150–300 dB.

4,504,499

HEAT-STABILIZED, CAROTENOID-COLORED EDIBLE OILS

Jeffrey L. Finnan, Southgate, Mich., assignor to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Apr. 25, 1983, Ser. No. 488,160

Int. Cl.[3] **A23L** *1/275, 1/101*

U.S. Cl. 426—250 **3 Claims**

1. A process for preparing colored fried foods comprising the step of heating said food at temperatures sufficient to cook said food in the presence of an edible oil, a colorizing amount of a carotenoid, and an oxidation stabilizing amount of a stabilizer which is a mixture of lauryl thiodipropionate or dilauryl thiodipropionate in combination with an effective amount of a tocopherol.

4,504,500

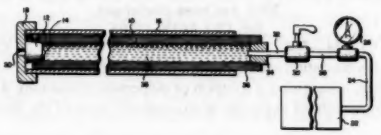
METHOD OF COATING A SHIRRED CASING STRAND WITH SMOKE FLAVOR

James C. Schneck, and Patrick J. Ford, both of Manitowoc, Wis., assignors to Red Arrow Products Company Inc., Manitowoc, Wis.

Filed Aug. 17, 1982, Ser. No. 408,833

Int. Cl.[3] **A22C** *11/00, 13/02*

U.S. Cl. 426—265 **8 Claims**



1. A method which comprises:

placing a liquid smoke flavor solution in contact with at least the internal or external surface of a shirred casing strand after said strand is completely shirred;

applying an increased pressure on the shirred casing strand surface in contact with the solution so that the smoke solution is forced to flow between the pleats or folds of the casing and thereby coats essentially the entire surface of the casing, in completely shirred form, in contact with the solution;

eliminating the pressure applied to the shirred casing strand and removing any excess liquid smoke from the casing; and

while the casing is still wet with the liquid smoke, stuffing the casing with a meat formulation and cooking the resulting encased meat product, thereby producing a meat product with a smoke flavor and brown colored surface.

4,504,501

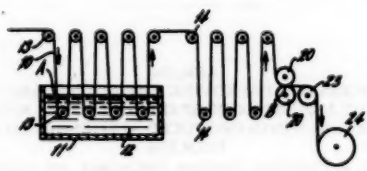
METHOD FOR PRODUCING SMOKE COLORED AND SMOKE FLAVORED ENCASED FOODSTUFF

Myron D. Nicholson, Lockport, Ill., assignor to Union Carbide Corporation, Danbury, Conn.

Division of Ser. No. 417,172, Sep. 14, 1982, Pat. No. 4,431,032, which is a continuation-in-part of Ser. No. 311,909, Oct. 16, 1981, abandoned. This application Nov. 30, 1983, Ser. No. 556,464

Int. Cl.[3] **A22C** *11/00, 13/00;* **A23L** *1/22*

U.S. Cl. 426—284 **8 Claims**



1. A method for producing a smoke colored and smoke flavored foodstuff comprising the steps of: providing a tar-containing aqueous liquid smoke solution comprising a mixture of constituents with smoke coloring and smoke flavoring capability, having an absorptive power of at least about 0.25 at 340 nm. wave length; at least partially neutralizing said aqueous liquid smoke solution by contacting a high pH constituent therewith in sufficient quantity to raise the pH to a level above about 4 to thereby form a tar-enriched fraction and a tar-depleted liquid smoke fraction; controlling the temperature of said aqueous liquid smoke solution during said neutralizing so that the solution temperature does not rise above about 40° C.; separating said tar-enriched fraction and said tar-depleted

liquid smoke fraction with the latter forming an aqueous tar-depleted liquid smoke composition; treating a surface of a tubular food casing with said tar-depleted liquid smoke composition in sufficient quantity to provide an absorptive index of at least about 0.2 at 340 nm. wave length for the casing wall; stuffing the so-treated casing with foodstuff; and processing the resulting encased foodstuff so as to impart smoke color and smoke flavor to the encased foodstuff by transfer of smoke color and smoke flavor constituents from the casing to the encased foodstuff.

4,504,502

COATED FOOD PRODUCT AND METHOD OF MAKING SAME

Roland D. Earle, 9201 W. Brow Rd. Blvd. #C-220, Plantation, Fla. 33324, and Donald H. McKee, 204 S. O'Brian St., Tampa, Fla. 33609

Filed Apr. 6, 1983, Ser. No. 482,678
Int. Cl.³ A23L *1/04*
U.S. Cl. 426—293 **16 Claims**

1. A process for coating food products comprising:
(a) applying an aqueous dispersion containing water soluble algin to the surface of a food substrate,
(b) the aqueous dispersion having a viscosity effective to substantially uniformly coat the surface of the food substrate, and then
(c) applying a dry gelling mixture containing a calcium ion to the algin-coated food substrate for a period of time sufficient to form a substantially continuous edible alginate film along the surface of the food substrate, said particle gelling mixture having a particle size sufficient to obtain a uniform gelling mixture
(d) said film being sufficient to effectively retard the migration of moisture from the surface of the food substrate thereby retarding dehydration thereof,
(e) said film being sufficient to constitute an oxygen barrier for retarding oxidation of the food substrate and to retain flavor within said food substrate.

4,504,503

FRACTIONATION OF BUTTERFAT USING A LIQUEFIED GAS OR A GAS IN THE SUPERCRITICAL STATE

Gerhard Biernoth, Quickborn, and Werner Merk, Buchholz, both of Fed. Rep. of Germany, assignors to Lever Brothers Company, New York, N.Y.

Filed Sep. 1, 1982, Ser. No. 413,937
Claims priority, application United Kingdom, Sep. 9, 1981, 8127261
Int. Cl.³ A23D *5/02*
U.S. Cl. 426—312 **6 Claims**

6. A process for producing a mixture of triglycerides having butter-like properties, comprising
(a) extracting butterfat with a gas in the supercritical state, said gas being selected from the group consisting of N_2O, SF_6, CF_3Cl, CF_2Cl, CH_2CF_2, C_3F_8, CHF_3, ethane, propane, butane, ethylene, acetone, carbon dioxide and mixtures thereof, said gas being under pressure and temperature conditions such that a fraction (i) in which from 65 to 100 per cent by weight of the triglycerides having a carbon number ranging from 24 to 42, dissolves in said gas and a fraction (ii) enriched in triglycerides having a carbon number higher than 42 remains as a residue, and
(b) separating fraction (i) from said gas by applying conditions at which the solubility of the triglycerides in said gas is lower than under the extraction conditions.

4,504,504

TEXTURE PRESERVATION FOR DICED FRESH FOOD PRODUCTS USING GELLED POLYURONIC ACIDS

David P. Gaehring, Collingswood, and John V. Scanlon, Haddonfield, both of N.J., assignors to Campbell Soup Company, Camden, N.J.

Filed Mar. 14, 1983, Ser. No. 475,021
Int. Cl.³ A23B *7/14*; A23L *1/216, 1/212, 1/04*
U.S. Cl. 426—321 **11 Claims**

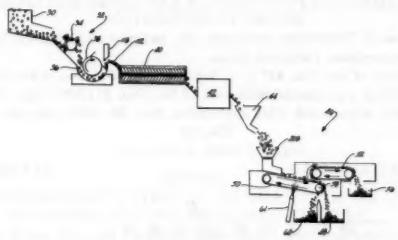
1. A method for preserving the naural texture of a diced pectin-containing fresh fruit or vegetable product suitable for canning comprising the steps of:
(a) contacting said diced, pectin-containing fresh fruit or vegetable product with aqueous polyuronic acid-containing solution for a period of time sufficient to absorb said polyuronic acid into the natural cellular structure of said fruit or vegetable product and thereby form a polyuronic acid-impregnated product, and
(b) contacting said polyuronic acid-impregnated, diced, pectin-containing fresh food product with an effective amount of an aqueous source of di-valent metal cations to cause gelation of said absorbed polyuronic acid.

4,504,505

METHOD FOR MAGNETICALLY SEPARATING NUTSHELLS FROM NUTMEATS

Vincent L. Rodriguez, 1310 Cambridge Rd., San Marino, Calif. 91108, and Rudolph R. Rodriguez, 735 Camellia Dr., Covina, Calif. 91723

Filed Sep. 26, 1983, Ser. No. 535,938
Int. Cl.³ A23N *5/00*; B03C *1/00*
U.S. Cl. 426—482 **28 Claims**



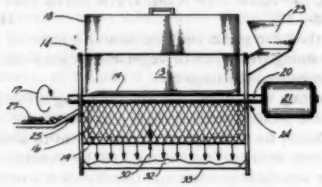
1. A method for shelling a nut and for separating nut meat from nutshell pieces comprising the steps of:
applying a hardenable binder comprising a glue to an unshelled nut for subsequently adhering ferromagnetic particles to the nutshell;
treating the binder on the nutshell with a normalizer to form a coating of binder of predetermined thickness substantially uniformly over the entire exterior surface of the nutshell;
thereafter applying to the binder on the nutshell ferromagnetic particles of predetermined size substantially uniformly over the binder-coated surface of the nutshell for adherence of the particles to the nutshell by the binder, to thereby render the nutshell and pieces thereof magnetically sensitive;
thereafter cracking the nutshell to free the meat from the shell and to provide a mixture of magnetically sensitive nutshell pieces and of meats; and
subjecting the mixture to magnetic forces to separate the magnetically sensitive nutshell pieces from the meats.

4,504,506

METHOD FOR CHOPPING OLIVES

Edward H. Vivier, 3350 Harvard, Visalia, Calif. 93277

Filed Sep. 9, 1982, Ser. No. 416,264
Int. Cl.³ A23N *4/08*; A47J *23/00*
U.S. Cl. 426—485 12 Claims



1. A method for chopping olives comprising:

feeding whole olives into an abrading zone in a pulper, the pulper comprising a screen extending at least partially around the periphery of the abrading zone, the screen having openings from about ¼ inch to about ⅜ inch wide, the pulper also comprising a rotatable paddle set at a height of about ¼ inch off the screen;

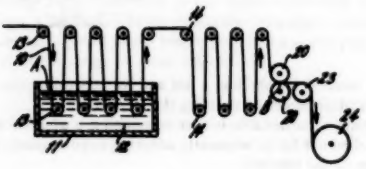
rotating the paddle from about 290 rpm to about 450 rpm to abrade the olives between the paddle and screen and force a chopped olive meat in the form of shredded olive pieces of substantially uniform size through the sceen, while separating the olive pits from the chopped olive meat; and collecting the chopped olive meat from outside the screen.

4,504,507

METHOD FOR PREPARING A TAR-DEPLETED LIQUID SMOKE COMPOSITION

Myron D. Nicholson, Lockport, Ill., assignor to Union Carbide Corporation, Danbury, Conn.

Division of Ser. No. 417,172, Sep. 14, 1982, Pat. No. 4,431,032, which is a continuation-in-part of Ser. No. 311,909, Oct. 16, 1981, abandoned. This application Nov. 30, 1983, Ser. No. 556,465
Int. Cl.³ A23L *1/232, 1/27*
U.S. Cl. 426—533 13 Claims



1. A method for preparing an aqueous liquid smoke composition comprising the steps of: providing a tar-containing aqueous liquid smoke solution at temperature below about 40° C. and having an absorptive power of at least about 0.25 at 340 nm. wave length; at least partially neutralizing said aqueous liquid smoke solution by contacting a high pH constituent therewith in sufficient quantity to raise the pH thereof to above about 4 to thereby form a tar-enriched fraction and a tar-depleted liquid smoke fraction; controlling the temperature of said aqueous liquid smoke solution during said neutralizing so that the solution temperature does not rise above about 40° C.; and separating said tar-enriched fraction and said tar-depleted liquid smoke fraction to recover the latter as said aqueous liquid smoke composition.

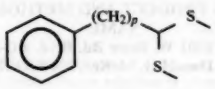
4,504,508

FLAVORING WITH PHENYLALKYL MERCAPTALS

Alan O. Pittet, Atlantic Highlands; Thomas F. Courtney, Jr., Oakhurst, and Ranya Muralidhara, Fair Haven, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Continuation-in-part of Ser. No. 541,151, Oct. 12, 1983,. This application Apr. 20, 1984, Ser. No. 602,513
Int. Cl.³ A23L *1/226, 1/234*
U.S. Cl. 426—535 8 Claims

1. A process for augmenting or enhancing the aroma or taste of a foodstuff comprising the step of intimately admixing with said foodstuff 0.005 ppm up to about 50 ppm of at least one compound defined according to the structure:



wherein p represents 0 or 1.

4,504,509

LIQUID BATTER FOR COATING FOODSTUFFS AND METHOD OF MAKING SAME

Harvey Bell, Martinsville; Julianne M. Lenchin, Plainsboro, and Gary A. Zwiercan , Califon, all of N.J., assignors to National Starch & Chem. Corp., Bridgewater, N.J.

Filed Jul. 28, 1982, Ser. No. 402,429
Int. Cl.³ A21D *10/00*
U.S. Cl. 426—549 26 Claims

1. An aseptically processed liquid batter for use in coating foodstuffs prior to cooking, said batter having been aseptically processed by a combination of temperature and pressure sufficient to destroy the bacteria therein and permit room temperature storage, said batter comprising a blend of a substantially ungelatinized starch and water; said starch having an amylose content of at least 55% and being highly crosslinked to a level enabling the starch granules to remain in the substantially ungelatinized state through aseptic processing, said batter having a Brookefield viscosity of 1,000–5,000 cps as measured at 80° F. and a solids content of 60%.

4,504,510

METHOD OF PREPARING FREEZE-THAW AND REFRIGERATOR STABLE PANCAKE BATTER AND PRODUCT THEREOF

Ellen S. Aliberto, Beacon; Constance R. Corbett, White Plains, and Randall S. McIntyre, Tarrytown, all of N.Y., assignors to Stauffer Chemical Company, Westport, Conn.

Filed May 28, 1982, Ser. No. 382,996
Int. Cl.³ A21D *10/00*
U.S. Cl. 426—553 22 Claims

1. A method for preparing a refrigerator stable, freeze-thaw stable pancake batter comprising from about 60% to about 80% flour, from about 5% to about 15% sugar, from about 2% to about 5% water soluble protein, and an amount of leavening sufficient to leaven the pancakes and from about 2% to about 10% of an emulsified plastic shortening, said percentages being by weight based on the dry weight of the batter, said emulsifiers of said emulsified plastic shortening comprising from about 5% to about 6.25% mono- and diglycerides and from about 7.5% to about 9.5% propylene glycol mono- and diesters of fats and fatty acids, said latter percentages being based on the weight of said emulsified plastic shortening, which comprises blending said ingredients with a sufficient amount of water to prepare a batter, aerating said batter until a specific gravity ranging from about 0.8 to about 1.0 is obtained and freezing said batter while aerated and maintaining said specific gravity.

4,504,511

PROCESS FOR FORMING EXTRUDED ICE CONFECTIONS AND PRODUCTS FORMED THEREBY

Gary N. Binley, Northamptonshire, England, assignor to Thomas J. Lipton, Inc., Englewood Cliffs, N.J.

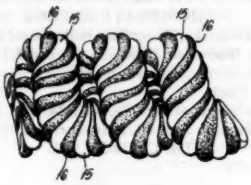
PCT No. PCT/GB81/00137, § 371 Date Feb. 19, 1982, § 102(e) Date Feb. 19, 1982, PCT Pub. No. WO82/00241, PCT Pub. Date Feb. 4, 1982

PCT Filed Jul. 31, 1981, Ser. No. 355,753

Claims priority, application United Kingdom, Jul. 11, 1980, 8022792

Int. Cl.[3] A23G *9/04, 9/22*

U.S. Cl. 426—565 5 Claims



1. A process for preparing an ice confection with projecting and relatively recessed relief features on its outer surface, comprising the steps of extruding the ice confection material from a rotating extrusion nozzle having a cross-section with an assymmetrical configuration with respect to the rotation axis, passing the extruded material from the nozzle immediately into an unconfined space and on to an elongate travelling conveyor which does not share the rotational motion of the extrusion nozzle, and thereby laying down on the conveyor an extended spirally-formed extrudate with projecting and reltively recessed relief features derived from its extrusion through the nozzle of assymmetrical configuration.

4,504,512

PUDDING MIX COMPOSITION

Robert L. Danielson; Peter M. Bosco, both of Brookfield Center, Conn., and Wayne L. Steensen, Newark, Del., assignors to Nabisco Brands, Inc., Parsippany, N.J.

Continuation-in-part of Ser. No. 549,624, Nov. 7, 1983, abandoned. This application Jan. 5, 1984, Ser. No. 568,372

Int. Cl.[3] A23L *1/187, 1/195*

U.S. Cl. 426—579 20 Claims

1. A dry pudding mix composition adapted to produce an edible pudding upon admixture with milk, comprising a dry particulate, free-flowing mixture of pregelatinized starch, sugar, an alkali metal pyrophosphate, an alkali metal orthophosphate, and, based upon the weight of the dry composition, from about 0.1 to about 0.6% of an emulsifier component, wherein said emulsifier component comprises a mixture of mono- and diglycerides, and wherein the pregelatinized starch component comprises a mixture of first and second pregelatinized starches, derived from tapioca starch, waxy maize starch or mixtures thereof, said first pregelatinized starch being a chemically-modified, lightly cross-linked, moderately substituted pregelatinized starch characterized by being of high viscosity when swelled in aqueous systems and by producing a firm, long, elastic (fudgy) texture when employed in a milk-based, phosphate gelled pudding, and said second pregelatinized starch being a chemically-modified, lightly cross-linked, highly-substituted pregelatinized starch characterized by being of high viscosity when swelled in aqueous systems and by producing a short, smooth texture when employed in a milk-based, phosphate gelled pudding, whereby a pudding made upon mixing said mix composition with milk possesses a creaminess and smoothness closely simulating that of a cooked pudding and a firmness and cutting ability suitable for use of the pudding as a filling for pastry or pies.

4,504,513

NEUTRAL FLAVORED HIGH STABILITY PEANUT PASTE

David J. Black, Tyrone, Pa., assignor to James W. Gardner Enterprises, Inc., Tyrone, Pa.

Continuation of Ser. No. 196,321, Oct. 14, 1980, Pat. No. 4,364,967. This application Dec. 10, 1982, Ser. No. 448,523

The portion of the term of this patent subsequent to Dec. 21, 1999, has been disclaimed.

Int. Cl.[3] A23L *1/36;* A23P *1/00*

U.S. Cl. 426—632 3 Claims

1. A process for producing an extender for foods selected from the class consisting of bakery and marzipan products, said process comprising the steps of:

(a) blanching a starting batch of peanuts;

(b) pressing said peanuts in order to distort said peanuts while substantially preserving their particle integrity in order to remove a substantial proportion of the natural oil contained therein;

(c) reconstituting and roasting said peanuts while substantially preserving their particle integrity in a first bath of high stability oil in the range of from 275° to 350° F.;

(d) quenching said peanuts while substantially preserving their particle integrity in a second bath of high stability oil at a temperature substantially in the range of from 140° to 170° F.;

(e) said high stability oil replacing said natural oil in said peanuts to produce an intermediate batch of peanuts containing from 45 to 60 weight percent of said high stability oil;

(f) cooling said peanuts while substantially maintaining their particle integrity to set up said high stability oil therein;

(g) milling said peanuts into a paste characterized by a particle size of less than 74 microns;

(h) and vacuum degassing said paste to substantially remove entrained oxygen;

(i) said paste being characterized by substantially neutral flavor, high stability, and compatibility with said foods.

4,504,514

SOYBEAN-BASED FIBROUS OR GRANULAR FOOD MATERIAL HAVING IMPROVED TEXTURE

Shiro Kudo, Ito, and Megumi Mukaiyama, Shimonia, both of Japan, assignors to Asahi-matsu Foods Inc., Nagano and Takeda Chemical Industries, Ltd., Osaka, both of, Japan

Filed Oct. 19, 1982, Ser. No. 435,393

Claims priority, application Japan, Oct. 22, 1981, 56-168954; Nov. 20, 1981, 56-186471

Int. Cl.[3] A23J *3/00;* A23L *1/20*

U.S. Cl. 426—634 7 Claims

1. A soybean-based fibrous or granular food material which comprises (1) fibrous or granular material produced by adjusting the water content of soybean material to between about 30 to about 60 weight percent and grinding said soybean material between two opposing disc grinding members separated by a gap not larger than 1 mm, wherein one of the grinding members rotates at a peripheral speed from 8 to 8000 m/min, and wherein the opposing discs are concave to form a central hollow portion therebetween having an appoximately trapezoidal cross section, said fibrous or granular material being impregnated with both (2) about 0.01 to about 2 gram equivalents of acetic acid, and (3) about 0.03 to about 0.6 gram equivalent of an edible calcium or magnesium salt, the amounts of said acid and salt being per kilogram of the soybean material on a dry basis.

4,504,515

PROCESS FOR PREPARING LOW-FAT MEAT PRODUCTS AND IN PARTICULAR SAUSAGES WITH HIGH PROTEIN CONTENT

Hermann Hohenester, Strass 21, Burgkirchen, and Wolfgang Hohenester, Braugasse 25, 8260 Mühldorf, both of Fed. Rep. of Germany

Continuation of Ser. No. 220,402, Dec. 29, 1980, abandoned, which is a continuation of Ser. No. 71,446, Aug. 31, 1979, abandoned, which is a continuation of Ser. No. 859,503, Dec. 9, 1977, abandoned, which is a continuation of Ser. No. 675,033, Apr. 4, 1976, abandoned, which is a continuation of Ser. No. 582,023, May 29, 1975, abandoned, which is a continuation-in-part of Ser. No. 478,545, Jun. 11, 1974, abandoned, which is a continuation of Ser. No. 298,973, Oct. 19, 1972, abandoned. This application Apr. 14, 1983, Ser. No. 484,006

Claims priority, application Fed. Rep. of Germany, Oct. 22, 1971, 2203582; Jan. 26, 1972, 2152655

Int. Cl.³ A22C *11/00*

U.S. Cl. 426—641 **2 Claims**

1. A process for preparing meat products comprising thoroughly admixing a mixture consisting of 13 to 40 weight percent of frozen skimmed milk or frozen whole milk and from 55 to 80% by weight of lean meat selected from the group consisting of beef, veal, pork and hare in the absence of any emulsifier and in the presence of less than 5% by weight of seasonings and/or preservatives and then heating said mixture in a container at from 65° to 100° C. for at least 20 minutes.

4,504,516

METHOD FOR THE PREPARATION OF POWDERIZED HONEY PRODUCTS, THE PRODUCTS OBTAINED ACCORDING TO THE METHOD AND THEIR USE

Rudolf Schanze, Neumarkt, Fed. Rep. of Germany

Filed Feb. 8, 1983, Ser. No. 464,909

Claims priority, application Fed. Rep. of Germany, Feb. 9, 1982, 3204367

Int. Cl.³ A23L *1/08*

U.S. Cl. 426—658 **24 Claims**

1. A method for the preparation of a powdered honey product which contains at least 50 weight percent honey comprising the step of combining with agitation 5 to 25 weight percent pyrogenic or precipitated fine grained silica with 50 to 85 weight percent of a honey component which is honey or a mixture of honey and at least one bee product selected from the group consisting of beebread, pollen, royal jelly, drone syrup, queen syrup, beeswax, propolis and propolis extract at a temperature not exceeding 35° C., said percentages based on the final powdered honey product.

4,504,517

PROCESS FOR THE REINFORCEMENT OF FLEXIBLE FLAT PARTS, SUCH AS TOP CLOTHS OR LININGS FOR ARTICLES OF CLOTHING

Josef Hefele, Gräfelfing, Fed. Rep. of Germany, assignor to Kufner Textilwerke GmbH, Munich, Fed. Rep. of Germany

Filed Apr. 5, 1983, Ser. No. 482,200

Claims priority, application Fed. Rep. of Germany, May 13, 1982, 3218050

Int. Cl.³ B05D *1/14*

U.S. Cl. 427—13 **10 Claims**

1. Process for the reinforcement of cut-out panels of fabrics, such as top cloths for articles of clothing, or linings for such articles, the process comprising: printing the flat parts on one side by a photogravure process with an aqueous cross-linkable dispersion paste; electrostatically flocking the flat parts, preferably with fibrous flocks, with the flocks adhering to said paste; pre-stabilising the paste by heat coagulation and/or by predrying; and then causing a condensation reaction to take place in said paste, which reaction is carried out

(a) with exclusion of incoming air,

(b) under pressure (exerted between planar or arcuate covers, between which the flat parts are enclosed) from 10 to 150 p/cm^2, and

(c) in the temperature range from 90° to 175° C.

4,504,518

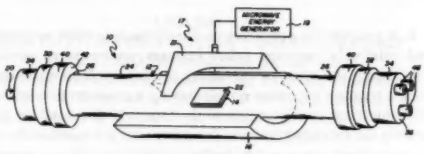
METHOD OF MAKING AMORPHOUS SEMICONDUCTOR ALLOYS AND DEVICES USING MICROWAVE ENERGY

Stanford R. Ovshinsky, Bloomfield Hills; David D. Allred, Troy; Lee Walter, Bloomfield Hills, and Stephen J. Hudgens, Southfield, all of Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.

Continuation-in-part of Ser. No. 423,424, Sep. 24, 1982,. This application Apr. 30, 1984, Ser. No. 605,575

Int. Cl.³ B05D *3/06*

U.S. Cl. 427—38 **42 Claims**



1. A process for depositing amorphous semiconductor alloy films onto a substrate, comprising:

providing a source of microwave energy;

coupling said microwave energy into a substantially enclosed reaction vessel containing the substrate;

introducing into said vessel at least one reaction gas to form a glow discharge plasma within said vessel to form reaction gas species from said reaction gas; and

evacuating said reaction vessel to a deposition pressure of 0.1 torr or less so as to provide for the deposition of an amorphous semiconductor alloy film from said reaction gas species onto said substrate at high deposition rates with high reaction gas conversion efficiencies without any significant powder or polymeric inclusions.

4,504,519

DIAMOND-LIKE FILM AND PROCESS FOR PRODUCING SAME

Joseph Zelez, Tannersville, Pa., assignor to RCA Corporation, New York, N.Y.

Division of Ser. No. 348,021, Feb. 11, 1982, abandoned. This application Nov. 3, 1983, Ser. No. 548,040

Claims priority, application United Kingdom, Oct. 21, 1981, 8131794

Int. Cl.³ B05D *3/06*

U.S. Cl. 427—39 **7 Claims**

1. A process for depositing an amorphous, carbonaceous film having a stress below 10^{10} dynes/cm^2 and a hydrogen content of one or less atomic percent on a substrate in an evacuated deposition chamber having an internal pair of substantially horizontal and parallel, vertically spaced carbon electrodes, and means for applying radio frequency power to said pair of electrodes; comprising the steps of:

(a) positioning said substrate on the lower electrode of said pair of electrodes;

(b) stabilizing the pressure within said deposition chamber with a lower alkane containing from 1 up to about 6 carbon atoms at a pressure of from about 25 up to about 100 millitorr;

(c) applying radio frequency power to said pair of electrodes; and

(d) biasing the upper electrode of said pair in the range of from about −200 to about −3500 volts and said lower electrode in the range of from about 0 to about −100 volts, whereby said film deposits on said substrate by radio frequency plasma decomposition of said lower alkane.

4,504,520

PROCESS AND APPARATUS FOR PRODUCING WOOD HEADS OF GOLF CLUBS

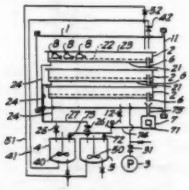
Koichiro Kurahashi, Nishinomiya, Japan, assignor to Sumitomo Rubber Industries, Inc., Kobe, Japan

Filed Jun. 5, 1984, Ser. No. 617,402

Claims priority, application Japan, Jun. 7, 1983, 58-102345; Jun. 8, 1983, 58-103323; Jun. 8, 1983, 58-103324

Int. Cl.³ B05D *3/06*

U.S. Cl. 427—44 **13 Claims**



1. A process for producing a wood head of a golf club by impregnating a wood head workpiece with a resin to give durability to the wood head, the process comprising the steps of:

forming the workpiece so that the hitting surface thereof extends in parallel with internal channels therein,

immersing the workpiece in a first liquid resin composition only at the hitting side to impregnate the hitting side with the composition at a high ratio and form a resin-impregnated layer of high impregnation ratio,

impregnating the entire workpiece with a second liquid resin composition at a low ratio, and

polymerizing and curing the first and second resin compositions.

12. A resin impregnation apparatus comprising a closed case connected to a vacuum pump, at least one receptacle disposed within the case, a resin composition supply pipe disposed above the receptacle and a liquid level adjusting tube attached to the bottom of the receptacle and positioned at an adjustable level.

4,504,521

LPCVD DEPOSITION OF TANTALUM SILICIDE

Alois E. Widmer, Berikon, and Roland Fehlmann, Au, both of Switzerland, assignors to RCA Corporation, New York, N.Y.

Filed Mar. 22, 1984, Ser. No. 592,397

Int. Cl.³ H01L *21/285*

U.S. Cl. 427—85 **9 Claims**

1. A method of forming on a substrate a structure comprising a layer of polycrystalline silicon having thereover a layer of tantalum silicide, said method being carried out in a single reaction vessel and comprising:

(a) depositing a layer of in-situ doped silicon on the substrate by low pressure chemical vapor deposition in a suitable reactor, said layer being deposited in the amorphous state from a vapor containing silicon and a suitable dopant;

(b) depositing a layer of tantalum silicide over the layer of silicon by stopping the flow of said dopant into the reactor and introducing tantalum pentachloride vapor while containing the flow of the source of silicon, said layer of tantalum silicide being deposited tantalum

4,504,522

METHOD OF MAKING A TITANIUM DIOXIDE OXYGEN SENSOR ELEMENT BY CHEMICAL VAPOR DEPOSITION

William J. Kaiser, Farmington Hills, and Eleftherios M. Logothetis, Birmingham, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Mar. 15, 1984, Ser. No. 589,790

Int. Cl.³ B05D *5/12*

U.S. Cl. 427—103 **8 Claims**

1. A method of making a titanium dioxide element which can be used as an oxygen sensing element, which method comprises the steps of:

obtaining a substrate for supporting a titanium dioxide film;

placing said substrate in a vacuum chamber;

drawing a vacuum on said vacuum chamber;

heating said substrate in said vacuum chamber to a temperature of 400°–700° C.;

flowing a low pressure carrier gas over said heated substrate, said carrier gas containing 1–10% by volume of oxygen;

adding a coating gas to said carrier gas for flowing over said substrate, said coating gas being an organometallic compound of titanium which is heat decomposable into a titanium dioxide coating phase and a heat volatilized phase, whereby titanium dioxide is coated onto said heated substrate, said coating gas and said carrier gas being at a total pressure from 100–200 Pa;

continuing the addition of said coating gas to said carrier gas and flowing of said gases over said substrate until a titanium dioxide film of a required thickness in a range from 10–150 um is built up on said substrate at a rate of 0.1–5 um per minute;

terminating said heating of said substrate and said flowing of said gases over said substrate when said titanium dioxide film of required thickness is coated on said substrate; and

heating said coated substrate to a temperature in a range from 800°–1100° C. for period of 1–10 hours to transform said titanium dioxide film formed on said substrate to a rutile phase with a stable, porous microstructure.

4,504,523

DURABLE, LOW-MAINTENANCE FLOORING TILE

Jesse D. Miller, Jr., Lancaster; James A. Tshudy, Ephrata, and Ralph E. Unruh, Denver, all of Pa., assignors to Armstrong World Industries, Inc., Lancaster, Pa.

Division of Ser. No. 362,645, Mar. 29, 1982, Pat. No. 4,418,109. This application Jun. 13, 1983, Ser. No. 503,423

Int. Cl.³ B32B *3/00, 5/16*

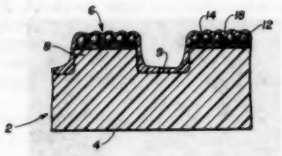
U.S. Cl. 427—197 **1 Claim**

1. A method of manufacturing a decorative plastic floor tile with raised and depressed areas comprising:

(a) providing a plastic tile in the approximate size range of 12″×12″ to 18″×18″;

(b) applying a first curable coating material matrix to only the raised areas of the plastic base, said curable coating material matrix being provided in amounts sufficient to bind together particles which may be placed on the matrix in a substantially abutting relationship and in a single layer fashion on the matrix;

(c) applying an excess of particles to the matrix and then removing the excess particles;
(d) embedding said remaining particles throughout the matrix in a substantially abutting relationship with the uppermost portion of the particles protruding above the matrix;
(e) the particles are rounded inorganic particles and have a Moh hardness greater than 4, and a particle size distribution such that none of the particles are greater than about



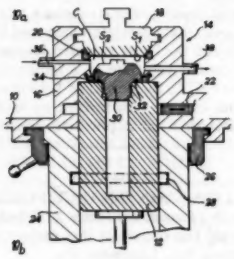
595 microns, and about 55% of the particles are between about 149 and 296 microns;
(f) curing the matrix;
(g) applying a second overall clear or translucent curable wear layer to form a continuous coating over both raised and depressed areas and in the raised areas, providing a coating over the particles such that the particles are below the uppermost surface of the wear layer; and
(h) curing the wear layer.

4,504,524

PROCESS FOR THE REMOTE COATING OF THE SURFACES OF A CAVITY, AS WELL AS THE APPLICATION OF THIS PROCESS

Pierre R. Auchapt, Bagnols, and Aimé J. Ferlay, Laudun, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Dec. 7, 1982, Ser. No. 447,656
Claims priority, application France, Dec. 24, 1981, 81 24221
Int. Cl.³ B05D 7/22
U.S. Cl. 427—230 **4 Claims**



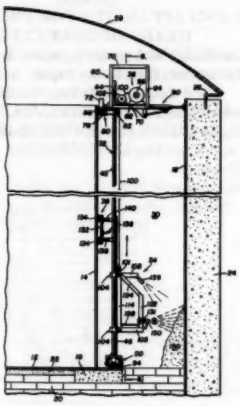
1. A method for remotely fixing toxic dust on the surfaces of a sealed cavity defined between the plugs of two plugged enclosures sealingly coupled to each other around said plugs, comprising:
(a) filling said cavity through at least one inlet zone to said cavity with a solution of silicone grease in a solvent capable of wetting the surface of said cavity,
(b) vaporizing said solvent in said cavity, and
(c) evacuating said solvent from said cavity, whereby the surfaces of said cavity are coated with said silicone grease thereby fixing said toxic dust thereto prior to uncoupling of said plugged enclosures.

4,504,525

METHOD OF COATING THE WALLS OF NARROW VERTICAL ELONGATED SPACES

Francis V. Bellafiore, Joliet, Ill., assignor to Chicago Bridge & Iron Company, Oak Brook, Ill.

Division of Ser. No. 405,162, Aug. 5, 1982,. This application Sep. 12, 1983, Ser. No. 531,041
Int. Cl.³ B05D 7/22
U.S. Cl. 427—230 **10 Claims**



1. A method of applying a coating to one of two walls forming a narrow vertical elongated space, comprising:
positioning, in the narrow vertical elongated space, an apparatus comprising a vertical guide track supporting a vertically displaceable carriage thereon, said carriage having means to apply a coating to one of the said walls;
securing the guide track against movement lateral to the two walls and sideways in the narrow vertical elongated space;
moving the carriage vertically on the guide track while applying a coating from the carriage to one of the said walls as a vertical band extending for a substantial part of the height of the elongated space;
moving the guide track adjacent an area of the same wall which has not been so coated and again securing the guide track against lateral and sideways movement;
moving the carriage vertically on the guide track while applying a coating from the carriage to the same wall as a vertical band extending for a substantial part of the height of the elongated space; and
repeating the described application of coating bands until a substantial portion of the wall is coated.

4,504,526

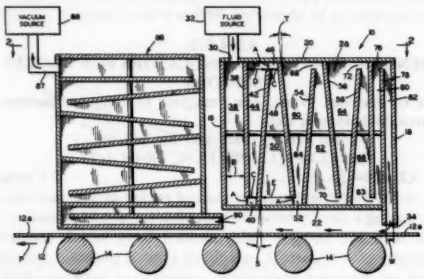
APPARATUS AND METHOD FOR PRODUCING A LAMINAR FLOW OF CONSTANT VELOCITY FLUID ALONG A SUBSTRATE

Peter H. Hofer, Perrysburg, and Eberhard R. Albach, Toledo, both of Ohio, assignors to Libbey-Owens-Ford Company, Toledo, Ohio

Filed Sep. 26, 1983, Ser. No. 535,798
Int. Cl.³ C23C 11/00, 13/00
U.S. Cl. 427—248.1 **27 Claims**

12. A method of producing a uniform laminar flow of a fluid along the surface of a substrate traveling in a linear path comprising the steps of:
(a) directing a fluid stream through a series of individual passageways causing the velocity of the fluid stream to vary as the fluid passes through the passageways to produce a uniform laminar flow of fluid; and
(b) directing the uniform laminar flow of fluid at a relatively

constant velocity onto the surface of the substrate through the entire length of an elongate outlet slot positioned adjacent the surface of the substrate and extending along at least a portion of the substrate.



4,504,527

METHOD FOR THE INSULATION OF HEATED METALIC MATERIALS

Sadao Hara; Hiroaki Moritani; Hisashi Kaga, all of Hokkaido; Toshihiro Minaki, Kanagawa; Kenichi Shibata, Kanagawa; Junichi Ogawa, Kanagawa, and Kaoru Umino, Tokyo, all of Japan, assignors to The Japan Steel Works, Ltd. and Nichias Corporation, both of Tokyo, Japan

Filed Feb. 16, 1982, Ser. No. 349,118
Claims priority, application Japan, Feb. 23, 1981, 56-24355
Int. Cl.³ B05D *3/02*
U.S. Cl. 427—318 **6 Claims**

1. A method for insulating heated metallic material comprising applying a mixture consisting essentially of 10 to 75% by weight of acidic aluminum phosphate, 5 to 70% by weight of a multivalent metal oxide, hydroxide, silicate or carbonate powder, and 20 to 80% by weight of water onto the surface of the heated metallic material and allowing the mixture to be heated by the heat of the heated metallic material to convert said mixture into a porous hardened material whereby an insulating coating layer is formed on the surface of the heated metallic material, wherein said powder is selected from at least one member of the group consisting of aluminum oxide, aluminum hydroxide, calcium silicate, zinc oxide, titanium oxide, silica, mulite, kaolin, bentonite, talc, limestone, and dolomite.

4,504,528

PROCESS FOR COATING AQUEOUS FLUOROPOLYMER COATING ON POROUS SUBSTRATE

Jerry Zucker, Charleston; Michael P. Singletary, and James L. Fabian, both of Goose Creek, all of S.C., assignors to RM Industrial Products Company, Inc., North Charleston, S.C.

Filed Jul. 11, 1983, Ser. No. 512,718
Int. Cl.³ B05D *3/02*
U.S. Cl. 427—389.8 **3 Claims**

1. Method of applying an impervious coating to porous substrate comprising the steps of preparing an aqueous suspension of solids comprising from about 2 to about 25 percent fluoroelastomer particles, zero to about 35 percent fillers, and the remainder as fluorocarbon resin particles, said fluoroelastomer being selected from the group consisting of copolymers of vinylidene fluoride and hexafluoropropylene, terpolymers of vinylidene fluoride, hexafluoropropylene and tetrafluoroethylene, alternating copolymers of propylene and tetrafluoroethylene, and mixtures thereof, said fluorocarbon resin being selected from the group consisting of polytetrafluoroethylene, tetrafluoroethylene-hexafluoropropylene copolymer, ethylene-tetrafluoroethylene copolymer, copolymer of perfluoroalkyl ethers and tetrafluoroethylene, and mixtures thereof, applying the aqueous suspension to the substrate to provide a coating thereon, and then heating the coated substrate under conditions to cause at least partial fusing of the fluorocarbon resin particles.

4,504,529

XEROGRAPHIC METHOD FOR DRY SENSITIZATION AND ELECTROLESS COATING OF AN INSULATING SURFACE AND A POWDER FOR USE WITH THE METHOD

Gunnar Sorensen, Risskov, and Leo G. Svendsen, Aarhus, both of Denmark, assignors to A/S Neselco, Copenhagen, Denmark

Continuation of Ser. No. 224,530, Dec. 11, 1980, abandoned. This application Jun. 18, 1982, Ser. No. 389,934
Claims priority, application Denmark, Apr. 11, 1979, 1507/79
Int. Cl.³ G03G *13/22*; C23C *3/02*
U.S. Cl. 427—437 **12 Claims**

1. A method for the dry, selective sensitization of the surface of an insulating substrate and subsequent electroless deposition of a metal, comprising:

xerographically depositing a dielectric powder containing a metal compound on an insulator substrate in a desired pattern;

fixing said deposited powder on the surface of said substrate; and

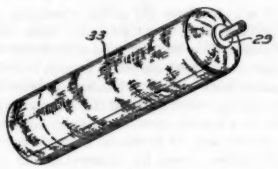
electrolessly depositing a conductive metal from solution onto the pattern defined by said xerographically deposited powder.

4,504,530

LINED PRESSURE VESSELS

Ward L. Bliley, Chesterland, Ohio, assignor to Structural Fibers, Inc., Mentor, Ohio

Division of Ser. No. 359,045, Mar. 17, 1982, Pat. No. 4,446,092. This application Jan. 20, 1984, Ser. No. 572,469
Int. Cl.³ B65D *1/16*
U.S. Cl. 428—35 **3 Claims**

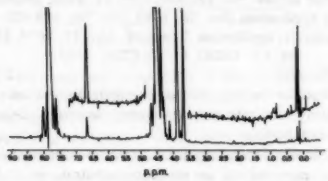


1. A hollow fiber-reinforced resin article comprising a hollow body including a cylindrical center wall portion and domed end portions, said body comprising a cured resin distributed homogeneously throughout the body as a seamless monolithic mass, in permeating relationship with a hollow reinforcing lay-up of loosely felted reinforcing fibers defining the shape of said body and in permeating relationship with an inner surfacing lay-up of stretchable polyester fibers covering the entire inner surfaces of the reinforcing fibers, the relative concentrations of resin and fiber in said hollow reinforcing lay-up and in said surfacing lay-up being non-uniform with the magnitude of the fiber-to-resin ratio being less in the surfacing lay-up than in the reinforcing lay-up.

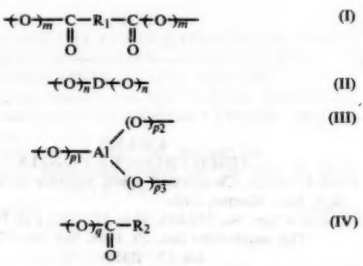
4,504,531
POLYESTER, ADHESIVES COMPRISING THE SAME, AND LAMINATES AND LAMINATED HOLLOW VESSELS MADE THEREOF

Yoshifumi Murata; Keishiro Igi, both of Kurashiki; Hiroshi Narukawa, Sojya; Masao Uetsuki, Kurashiki; Satoshi Bando, Kurashiki; Shuji Kawai, Kurashiki, and Kenji Shirano, Kurashiki, all of Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

Division of Ser. No. 561,838, Dec. 15, 1983,. This application May 30, 1984, Ser. No. 615,162
Claims priority, application Japan, Dec. 21, 1982, 57-225426; Jan. 26, 1983, 58-11924
Int. Cl.³ B32B 27/06
U.S. Cl. 428—35 8 Claims



1. A laminate comprising at least three layers, the construction thereof being such that the intermediate layer (a) is made of a thermoplastic polyester comprising the constituent units represented by the following formulas (I), (II), (III) and (IV):



wherein R_1, in its repeated occurrence in said polyester, represents one or more divalent groups each derived from a dicarboxylic acid selected from the group consisting of terephthalic acid, isophthalic acid, orthophthalic acid and a straight-chained aliphatic dicarboxylic acid containing 4 to 10 carbon atoms by removal of both carboxyl groups therefrom, R_2, in its repeated occurrence in said polyester, represents one or more monovalent groups each selected from the group consisting of an aliphatic or alicyclic monocarboxylic acid containing 6 to 30 carbon atoms and an aromatic monocarboxylic acid containing 7–20 carbon atoms by removal of the carboxyl group therefrom, D, in its repeated occurrence in said polyester, represents one or more divalent groups each derived from a diol selected from the group consisting of an aliphatic diol containing 2 to 10 carbon atoms and an alicyclic diol containing 6 to 8 carbon atoms by removal of both hydroxyl groups therefrom, and m, n, p_1, p_2, p_3 and q are each an integer of 0 or 1, said constituent units being bonded together in the combinations of (I)-(II), (I)-(III), (II)-(III), (II)-(IV), (III)-(III) and (III)-(IV) and via only one oxygen atom in each combination, the molar ratio (I):(II) being substantially 1:1, the molar ratio (I):(III) being in the range of 1,000:1 to 100:5 and the molar ratio (III):(IV) being in the range of 4:1 to 1:10, said polyester having an intrinsic viscosity of not less than 0.5 dl/g and a glass transition temperature of not higher than 30° C., a layer (B) on one side of layer (A) is made of a polyester 80–100 mole percent of which consists of ethylene terephthalate repeating units and the other layer (C) on the other side of layer (A) is made of an ethylene-vinyl alcohol copolymer, said laminate thus comprising the construction (B)/(A)/(C).

4,504,532
PHENOLIC BLAST TUBE INSULATORS FOR ROCKET MOTORS

Liles G. Herring, Waco, Tex., assignor to Hercules Incorporated, Wilmington, Del.

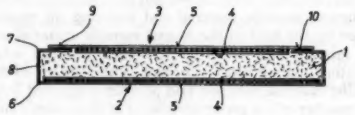
Filed Feb. 3, 1983, Ser. No. 463,366
Int. Cl.³ F16L 7/00, 59/02; D04H 1/58
U.S. Cl. 428—36 5 Claims

1. A blast tube insulator for tactical rocket motor, said insulator having a density between about 0.050 and 0.57 pounds per cubic inch and being a rigid, molded body which consists essentially of: 100 parts by weight of a cured phenolic resin in which are dispersed particulates consisting of between about 10 and 60 parts by weight finely divided silica particulate and between about 40 and 120 parts by weight of fibrous reinforcement selected from the group consisting of polyaramide pulps, carbon fibers and combination of said fibers and pulps.

4,504,533
GYPSUM CONSTRUCTION SHEET WITH GLASS FIBER/NON-WOVEN FELT LINING SHEET

Herbert Altenhöfer; Engelbert Wintzheimer, both of Iphofen, and Gerhard Neuhauser, Würzburg, all of Fed. Rep. of Germany, assignors to Gebr. Knauf Westdeutsche Gipswerke, Iphofen, Fed. Rep. of Germany

Continuation of Ser. No. 246,263, Mar. 23, 1981, abandoned. This application May 29, 1984, Ser. No. 614,703
Claims priority, application Fed. Rep. of Germany, Mar. 29, 1980, 3012293
Int. Cl.³ B32B 1/04, 31/18
U.S. Cl. 428—70 2 Claims



1. A gypsum construction board comprising a gypsum core formed by application of a water paste like slurry of a mixture of calcined gypsum, water and operational additive on a gypsum-free, dry lower lining sheet folded over upward around longitudinal edges of said core on which is placed a narrower upper gypsum-free, dry lining sheet having margins overlapping the margins of the lower lining sheet, both margins being bonded adhesively and said upper and lower lining being a two-layer laminate of an inner glass fiber web and an outer non-woven fiber felt, said web being embedded in the gypsum core over the width of the board and the glass fiber web of the lower lining sheet being omitted at folded-over sides and edges.

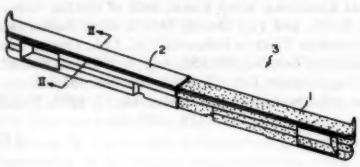
4,504,534
CORE MATERIAL FOR AUTOMOBILE BUMPERS

Akira Adachi, Sakura; Takashi Kubota, Utsunomiya; Yukio Okada, Fujisawa; Kenichi Miyazaki, Machida, and Taro Hagiwara, Sagamihara, all of Japan, assignors to Japan Styrene Paper Corporation, Tokyo and Nissan Motor Company, Limited, Yokohama, both of, Japan

Division of Ser. No. 504,289, Jun. 14, 1983, abandoned. This application Jun. 13, 1984, Ser. No. 619,693
Claims priority, application Japan, Jun. 19, 1982, 57-105660
Int. Cl.³ B32B 3/00
U.S. Cl. 428—71 3 Claims

1. In an automobile bumper which is composed of a core

material and a surface covering material, the improvement wherein said core material is composed of a molded article of foamed particles of a homopolymer of propylene or a copolymer of propylene with 1 to 30% by weight of an ethylenically



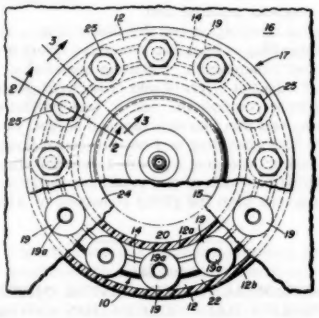
unsaturated monomer copolymerizable with it, said molded article having a density of 0.015 to 0.045 g/cm^3 and a compression stress at 50% compression of at least 1 kg/cm^2, and the said surface covering material is a synthetic resin.

4,504,535

FASTENING RING INSERT FOR A MOLDED PLASTIC ARTICLE

Larry L. Snyder, Lincoln, Nebr., assignor to Snyder Industries, Inc., Lincoln, Nebr.

Filed Nov. 10, 1982, Ser. No. 440,620
Int. Cl.^{3} B32B *3/10*
U.S. Cl. 428—137 **14 Claims**



1. A rigid fastening insert adapted to be molded into and embedded in the apertured wall of a molded plastic article, for fastening an object to the wall so that it communicates through the aperture from one side of the wall to the other, and reinforcing the wall to provide a substantially flat, fluid-tight sealing surface around the aperture where the object is to be fastened, said fastening insert comprising:

a rigid annular base adapted to surround the aperture;

a rigid raised rib integral with and projecting axially from said base; and

connecting means secured to said base and said rib and adapted to fasten the object to the wall.

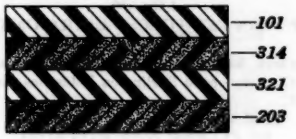
4,504,536

LAMINATED ARTIFICAL LEATHER AND METHOD OF MAKING

Winston W. Wong, 201, Tung Hwa North Rd., Taipei, Taiwan

Filed May 9, 1983, Ser. No. 493,057
Int. Cl.^{3} B32B *3/26, 5/20, 5/32, 27/30*
U.S. Cl. 428—151 **13 Claims**

1. Laminated artificial leather having a natural leather hand feel, comprising an unfoamed polymeric resin outer layer, a foamed polyvinyl chloride bottom layer having an abraded outer surface and at least one intermediate layer comprising a fabric free polyvinyl chloride between the facing surfaces of



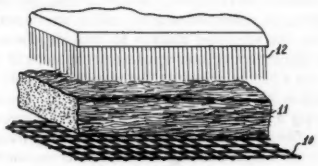
the outer and bottom layers, said outer layer being embossed at its outer surface to provide a leather look.

4,504,537

RUG UNDERLAY COMPRISING OPEN LATTICE WITH PARTIALLY FUSED NEEDLE PUNCHED FIBER LAYERS

Charles S. Mussallem, Jr., Jacksonville, Fla., assignor to No-Muv Corporation, Inc., Jacksonville, Fla.

Filed Dec. 20, 1982, Ser. No. 451,012
Int. Cl.^{3} B32B *3/28*
U.S. Cl. 428—167 **22 Claims**



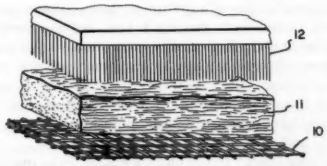
1. A rug underlay comprising a central open lattice of stiffening material, an intermediate layer of fiber batting on each side of the lattice, needle punched through the lattice, the outside surface of one of said intermediate layers including partially heat fused fibers produced by fusing and corrugating the upper surface of one of said intermediate layers and the outside surface of the other of said intermediate layers being covered with a layer of elastomeric material embossed with ridges in a grid design.

4,504,538

RUG UNDERLAY OF FIBERS NEEDLED INTO MESH

Charles S. Mussallem, Jr., Jacksonville, Fla., assignor to No-Muv Corporation, Inc., Jacksonville, Fla.

Filed Jul. 5, 1983, Ser. No. 510,610
Int. Cl.^{3} B32B *5/02*
U.S. Cl. 428—167 **24 Claims**



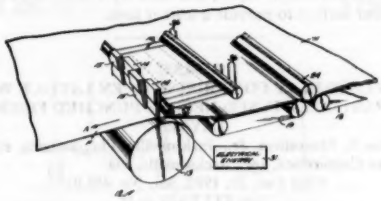
1. A rug underlay comprising a central open lattice of stiffening material, an intermediate layer of fiber batting on each side of the lattice, needle punched through the lattice, an upper outer corrugated layer of partially heat fused fibers produced by heat fusing and corrugating the upper surface of one of said

intermediate layers, and a lower outer layer of stiff, semi-flexible mixture of clay and a latex of an elastomeric material.

4,504,539
WARP YARN REINFORCED ULTRASONIC WEB BONDING

Vaclav Petracek, Bayside, N.Y., and Kenneth Y. Wang, Greensboro, N.C., assignors to Burlington Industries, Inc., Greensboro, N.C.

Filed Apr. 15, 1983, Ser. No. 485,452
Int. Cl.³ B29C *27/08*; B32B *31/20*
U.S. Cl. 428—195 **16 Claims**



1. A non-woven fabric produced by the method of: making a warp reinforced ultrasonically bonded fabric utilizing a plurality of ultrasonic vibration sources and an anvil means cooperating with the vibration sources to provide discrete bond sites in the fabric, the method comprising the steps of: continuously feeding a batt of primarily ultrasonically fusible fibers in a first direction toward and past the vibration sources and anvil means; laying a plurality of reinforcing yarns formed of bi-component fibers, each having a low melting temperature component and a high melting temperature component, in the warp direction prior to movement of the web into operative association with the vibration sources and anvil means, the reinforcing yarns in-line with at least some of the bond sites provided by the vibration sources and anvil means; and supplying energy to the vibration sources so that bonding of the fibrous batt into a non-woven fabric takes place at the location of the vibration sources and anvil means, and so that the low melting temperature component of the reinforcing yarn fibers melts at the bonding sites to effect adhesion of the high melting temperature component to the fibrous batt, while the high melting temperature component of the reinforcing yarn fibers remains substantially uneffected, so that the reinforcing yarns effect reinforcement of the formed non-woven fabric.

3. A method of making a warp reinforced ultrasonically bonded fabric utilizing a plurality of ultrasonic vibration sources and an anvil means cooperating with the vibration sources to provide discrete bond sites in the fabric, the method comprising the steps of:

(a) continuously feeding a batt of primarily ultrasonically fusible fibers in a first direction toward and past the vibration sources and anvil means;

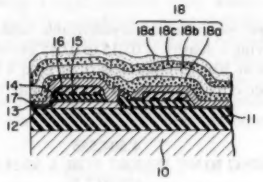
(b) laying a plurality of reinforcing yarns formed of bi-component fibers, each having a low melting temperature component and a high melting temperature component, in the warp direction prior to movement of the web into operative association with the vibration sources and anvil means, the reinforcing yarns in-line with at least some of the bond sites provided by the vibration sources and anvil means; and

(c) supplying energy to the vibration sources so that bonding of the fibrous batt into a non-woven fabric takes place at the location of the vibration sources and anvil means, and so that the low melting temperature component of the reinforcing yarn fibers melts at the bonding sites to effect adhesion of the high melting temperature component to the fibrous batt, while the high melting temperature component of the yarn fibers remains substantially uneffected, so that the reinforcing yarns effect reinforcement of the formed non-woven fabric.

4,504,540
THIN FILM ELEMENT

Nobuyuki Kaminaka; Kenji Kanai, both of Osaka; Noboru Nomura, Kyoto, and Yuji Omata, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 405,058, Aug. 4, 1982, abandoned. This application Feb. 27, 1984, Ser. No. 582,866
Claims priority, application Japan, Aug. 7, 1981, 56-123120
Int. Cl.³ B32B *3/00, 9/04*
U.S. Cl. 428—195 **5 Claims**



1. A thin film element, comprising:

a substrate;

a multilayer thin film structure formed on said substrate for performing a desired function, said structure having a layer comprising an organic material and a layer comprising a magnetic material; and

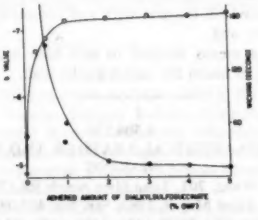
a protective covering on said thin film structure, said covering comprising at least two protective layers of different inorganic nonmagnetic insulating material or mixture thereof, adjacent layers of said protective covering being of different composition, one of said protective layers covering said thin film structure and another of said protective layers covering said one protective layer.

4. An element according to claim **1**, wherein the nonmagnetic insulating materials of said protective covering are two materials selected from the group consisting of Al_2O_3, SiO_2 and SiC.

4,504,541
ANTIMICROBIAL FABRICS HAVING IMPROVED SUSCEPTIBILITY TO DISCOLORATION AND PROCESS FOR PRODUCTION THEREOF

Kazuo Yasuda, Otsu; Kyo Funabashi, Nagaokakyo, and Akiyoshi Chiyoda, Toyonaka, all of Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Filed Jan. 25, 1984, Ser. No. 573,766
Int. Cl.³ C08L *83/04*
U.S. Cl. 428—264 **6 Claims**



1. An antimicrobial fabric having improved susceptibility to discoloration, which comprises a fabric treated with a quaternary ammonium base-containing organosilicone, wherein the quaternary ammonium cation contained in the organosilicone

is at least partially sealed with an anionic surfactant, said organosilicone being selected from the group consisting of diorganopolysiloxane having siloxane unit containing a quaternary ammonium base which is obtained by converting a tertiary nitrogen-containing group into the corresponding quaternary ammonium group and organosilicone of the following formula:

$$(R)_3Si—R'—N^+(R'')_n(R''')_{3-n}X^-$$

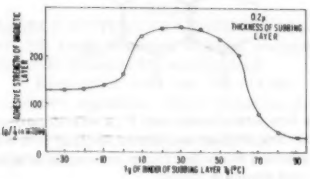
wherein R is an alkoxy group having 1 to 20 carbon atoms, a halogen atom, an alkanoyl group having 2 to 18 carbon atoms, hydroxy, or an alkyl having 1 to 20 carbon atoms, provided that at least two of the R groups are other than hydroxy and alkyl group; R′ is a divalent hydrocarbon group having 1 to 20 carbon atoms, or an oxygen- and/or nitrogen-containing divalent hydrocarbon group having 1 to 20 carbon atoms; R‴ is an alkyl group having 1 to 20 carbon atoms, an alkenyl group having 2 to 20 carbon atoms, or an aralkyl group having 7 to 10 carbon atoms; n is an integer of 1 to 3; X is an anion.

4,504,542

MAGNETIC RECORDING MEDIUM HAVING A SUBBING LAYER OF AMORPHOUS SATURATED POLYESTERS

Takahito Miyoshi; Toshimitu Okutu, and Masaaki Fujiyama, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jul. 21, 1983, Ser. No. 515,737
Claims priority, application Japan, Jul. 21, 1982, 57-127228
Int. Cl.³ B32B *7/02, 27/06*
U.S. Cl. 428—336 **7 Claims**



1. A magnetic recording medium comprising a support base having positioned thereon a subbing layer and a magnetic layer, wherein said subbing layer is composed of a first amorphous saturated polyester having a glass transition temperature of 10° C. to lower than 30° C. and a second amorphous saturated polyester having a glass transition temperature of 35° C. to 60° C., wherein the mixing ratio of said first amorphous saturated polyester to second amorphous saturated polyester is from 95/5 to 50/50, by weight, said subbing layer has a thickness of 0.03 μm to 0.5 μm.

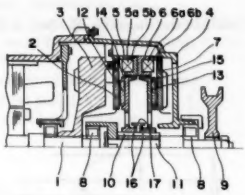
4,504,543

FRICTION MATERIAL

Fumitoshi Yamashita, Kyoto, and Tomiaki Sakano, Hirakata, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Jul. 20, 1983, Ser. No. 515,932
Claims priority, application Japan, Jul. 22, 1982, 57-128771; Jul. 22, 1982, 57-128772; Sep. 27, 1982, 57-166519
Int. Cl.³ B32B *9/00*
U.S. Cl. 428—338 **9 Claims**

1. A friction material for a clutch or brake which comprises a soft porous material and capsules containing therein a lubrication material comprising a hydrophobic substance in a liquid form, said porous material and said capsules being formed into a composite structure by a binding agent, said lubrication material forming a lubrication layer on said friction material upon breakage of said capsules said lubrication material being present in said capsules in an amount sufficient to provide



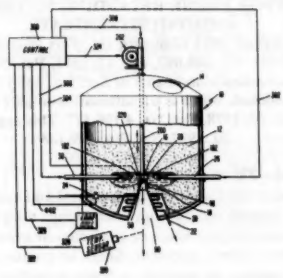
uniform lubrication upon breakage of said capsules and yet good adhesion of said friction material to a substrate.

4,504,544

HIGH QUALITY MINERAL WOOL

George J. Monaghan, Wayne, Pa., assignor to Energy Fibers Int'l. Corp., Niagara Falls, N.Y.

Continuation of Ser. No. 313,486, Oct. 21, 1981, abandoned, which is a continuation-in-part of Ser. No. 303,172, Sep. 17, 1981, Pat. No. 4,399,544, which is a continuation of Ser. No. 163,489, Jun. 27, 1980, abandoned. This application Nov. 14, 1983, Ser. No. 551,262
Int. Cl.³ B32B *5/16*
U.S. Cl. 428—357 **13 Claims**



1. Mineral wool produced from fly ash wherein at least 80% by weight of the mineral wool consists of fibrous strands having a diameter greater than about 5 microns and less than about 7 microns.

4,504,545

POLYAMIDE FIBERS HAVING IMPROVED PROPERTIES AND THEIR PRODUCTION

Kazuo Kurita, Otsu, and Hideaki Ishihara, Uji, both of Japan, assignors to Toyo Boseki Kabushiki Kaisha, Japan

Filed Sep. 8, 1982, Ser. No. 415,773
Claims priority, application Japan, Sep. 8, 1981, 56-142162
Int. Cl.³ D02G *3/00*
U.S. Cl. 428—364 **5 Claims**

1. A polyamide fiber excellent in strength, comprising a polyamide having a relative viscoisty of not less than 3.5 measured on a 96% by weight sulfuric acid solution having a polyamide concentration of 10 mg/ml at 20° C. and an index of birefringence (Δn) of not less than 50×10^{-3}, wherein:

the fiber long-period spacing value at length by small angle X-ray diffraction is not less than 100 Å;

the break strength is not less than 11.0 g/d;

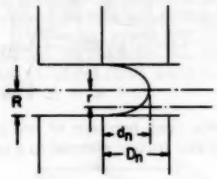
the break strength (g/d)×(break elongation (%))$^{\frac{1}{2}}$ ≧46.0; and

the index of birefringence in the section of the fiber satisfies the following relation:

$\Delta n_A - \Delta n_B \geq 0.5 \times 10^{-3}$,

where:

Δn_A = the index of birefringence of fiber at the position of r/R = 0.9;



Δn_B = the index of birefringence of fiber at the position of r/R = 0.0;

R = the radius of the section of fiber; and

r = the distance from the central axis of the section of fiber

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4,504,546

METHOD FOR FLAME RETARDING MATERIAL WITH AMMONIUMTRIBORATE

Stephen I. Sallay, 2918 Glencairn Dr., Fort Wayne, Ind. 46815

Division of Ser. No. 286,042, Jul. 22, 1981, Pat. No. 4,382,025, which is a continuation-in-part of Ser. No. 135,177, Mar. 28, 1980, abandoned, which is a continuation-in-part of Ser. No. 927,340, Jul. 24, 1978, Pat. No. 4,196,177. This application Sep. 30, 1982, Ser. No. 429,133

Int. Cl.³ D02G *3/00*

U.S. Cl. 428—375 **13 Claims**

1. A process for flame retarding natural and synthetic fibers which are subject only to dry laundering, which comprises applying ammoniumtriborate or a solution of ammoniumtriborate to natural fibers, synthetic fibers or mixtures thereof in sufficient quantity to provide a flame retarding amount of borates on said fibers.

5. Flame retarded fibers prepared by the process of claim 1.

4,504,547

PROCESS FOR PRODUCING SUPPORTS FOR CELL CULTURES AND SUPPORTS SO OBTAINED

Florian Horodniceanu, Meudon, and Raphaël Le Fur, Louviers, both of France, assignors to Institut Pasteur, Paris, France

Continuation of Ser. No. 930,226, Aug. 2, 1978, abandoned. This application Nov. 13, 1979, Ser. No. 93,050

Claims priority, application France, Aug. 8, 1977, 77 24421

Int. Cl.³ B32B *5/16, 9/00*

U.S. Cl. 428—407 **11 Claims**

1. Process for producing supports for cell cultures, comprising applying to glass or polysaccharide base supports a solution of a thermosetting plastic material comprising the reaction product of an aldehyde with a polyvinyl alcohol and then subjecting said support thus-coated to the effect of heat under sufficient conditions to permit hardening of said thermosetting plastic material and the sterilization of said thus-coated supports.

8. Supports for cell cultures obtained by the process according to claim 1.

4,504,548

OPTICAL INFORMATION RECORDING MEDIUM FOR SEMICONDUCTOR LASER

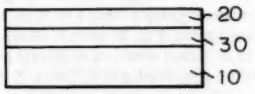
Sotaro Esho; Masaki Itoh, both of Tokyo, and Masaru Matsuoka, Nara, all of Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Jun. 23, 1983, Ser. No. 507,312

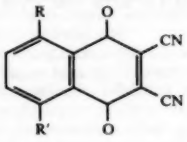
Claims priority, application Japan, Jun. 25, 1982, 57-109332; Sep. 10, 1982, 57-157475; Apr. 28, 1983, 58-74998; Apr. 28, 1983, 58-74999; Apr. 28, 1983, 58-75000; Apr. 28, 1983, 58-75001; Apr. 28, 1983, 58-75002; Apr. 28, 1983, 58-75006

Int. Cl.³ B32B *17/06, 15/04;* **G01D** *15/10*

U.S. Cl. 428—426 **13 Claims**



1. In an optical information recording medium having a substrate and a recording layer formed on at least one side of the substrate to permit information to be recorded thereinto or reproduced thereoutof by laser light, said recording layer comprising at least one of an organic film constituted by a naphthoquinonoid dye corresponding to the following molecular formula and an organic film whose major component is the naphthoquinonoid dye:



where R is a first auxochrome and R′ a second auxochrome.

2. The recording medium as claimed in claim 1, in which the substrate is selected from the group consisting of glass, synthetic resins and alminum alloys.

4,504,549

ELASTOMERIC SILICONE FINISHES APPLIED TO SUBSTRATES AND METHOD OF PREPARING SAME

Arthur N. Pines, Katonah, and Angelo J. Sabia, Yorktown Heights, both of N.Y., assignors to Union Carbide Corporation, Danbury, Conn.

Filed May 20, 1983, Ser. No. 496,397

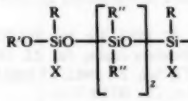
Int. Cl.³ B32B *9/04*

U.S. Cl. 428—447 **19 Claims**

1. A process for imparting an elastomeric finish to a substrate which comprises:

(a) applying to said substrate a silicone blend comprising:

(1) a crosslinkable silicone intermediate selected from the group of silicone compositions of the general formula:



wherein

R is individually hydrogen, OR′ or a substituted or unsubstituted hydrocarbon radical containing from 1 to 12 carbon atoms;

R′ is individually a hydrocarbon radical containing from 1 to 6 carbon atoms; and X is either R, OR′ or

$(C_nH_{2n}Si(R)_a(OR')_{3-3}$

wherein n is 1, 2 of 3 and a is 0, 1 or 2;

z has a value from 10 to 500; and R'' is individually a hydrocarbon radical containing from 1 to 12 carbon atoms and may be cyclic or noncyclic, branched or nonbranched, substituted or unsubstituted, or saturated or unsaturated and

(2) a silanol selected from the group of silanols of the general formula:

wherein

R''' is individually a hydrocarbon radical containing from 1 to 12 carbon atoms and may be cyclic or noncyclic, branched or unbranched, substituted or unsubstituted or saturated or unsaturated and y has a value of from 185 to 3500; and

(b) Catalyzing and curing the silicone blend onto the substrate to provide an elastomeric finish.

18. An elastomeric finish imparted on a substrate produced by the process of claim 1.

4,504,550

RELEASABLY MUTUALLY-ADHERENT MATERIALS

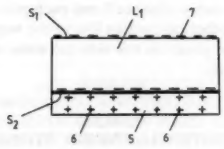
Harold W. M. Pook, Bromley, England, assignor to James Frederick John Johnson, Holmer, England

Filed Jul. 8, 1983, Ser. No. 511,881

Claims priority, application United Kingdom, Jul. 21, 1982, 8221050

Int. Cl.³ B32B *15/08, 27/08*

U.S. Cl. 428—461 **10 Claims**



1. A combination of two mutually-adherent plastics polymer laminae, having different but compatible physical and electrical characteristics whereby respective surfaces thereof are mutually adherent when pressed into surface contact, comprising:

a first lamina having a permanent or quasi-permanent electrostatic charge of negative polarity produced by electret charges in said lamina and a ductile polished surface providing a relatively high degree of surface friction; and

a second lamina which either has a positive electrostatic charge or is capable of being polarised by induction to acquire such a charge, which has a stable polished surface and which is of high tensile strength;

said first lamina having a trapped compensating electrostatic charge on its other surface by virtue of a closely disposed element attached to that surface.

2. The combination according to claim 1, wherein said attached element is a metallic film.

4,504,551

POLY(ARYLENE SULFIDE) COMPOSITIONS

John E. Leland, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 28, 1983, Ser. No. 489,446

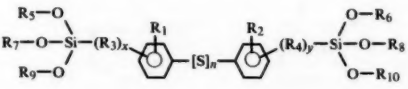
Int. Cl.³ C08K *3/40;* **C08L** *81/04*

U.S. Cl. 428—419 **55 Claims**

1. A composition of matter comprising

(a) poly(arylene sulfide),

(b) at least one silane within the formula:



wherein n is an integer from 1 to 30; **wherein each of** R_1 and R_2 is H or an alkyl group having 1 to 30 atoms; wherein each of R_5, R_6, R_7, R_8, R_9 and R_{10} is an alkyl group having from 1 to 30 carbon atoms; wherein x is 0 or 1; wherein y is 0 or 1; and wherein each of R_3 and R_4 is an alkylene group having from 1 to 30 carbon atoms and

(c) glass.

4,504,552

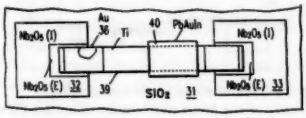
INTEGRATED RESISTOR OF NIOBIUM OXIDE PASSIVATING RING, GOLD CORROSION BARRIER, AND TITANIUM RESISTIVE LAYER

Kwang K. Kim, Poughkeepsie, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 454,911, Dec. 30, 1982, Pat. No. 4,459,321. This application Mar. 16, 1984, Ser. No. 590,319

Int. Cl.³ H01L *3/00, 5/00*

U.S. Cl. 428—620 **6 Claims**



1. A contact structure for use with an intrinsically oxidizable conductive-metal layer in an integrated circuit characterized by

(a) an oxide-free area of oxidizable conductive metal made free of intrinsic conductive metal oxide;

(b) a corrosion barrier film forming a contact area film on said oxide-free area of the oxidizable conductive metal layer, having an exposed surface and edge, centrally located within said oxide-free area, and not fully covering said oxide free area;

(c) a passivating ring of extrinsic metal oxide grown on the remaining oxide-free area surface of the oxidizable conductive metal layer about the periphery of said corrosion barrier film, extending to the edge of the oxide-free area; and

(d) a resistive metal layer covering the exposed surface and edge of said corrosion barrier contact film.

4,504,553

COVERING FOR PHOTOTHERMAL CONVERSION

André Aubert, Grenoble; Jean Valignat, Eybens, and Christophe Wyon, Saint Martin d'Heres, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Mar. 30, 1983, Ser. No. 480,483

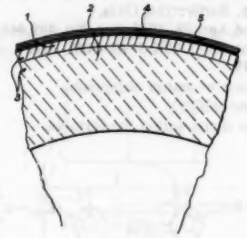
Claims priority, application France, Mar. 31, 1982, 82 05531

Int. Cl.³ C25D *11/34*

U.S. Cl. 428—622 **11 Claims**

1. A covering for photothermal coversion, comprising an

infrared radiation reflecting substrate, a first layer deposited on said substrate and consisting of at least one metal or alloy of



said metal, and a second layer deposited on the first layer, said second layer consisting of an amorphous material capable of absorbing solar radiation.

4,504,554

ROTOR SHAFT OF STEAM TURBINE

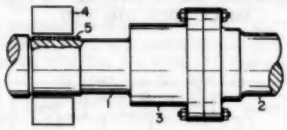
Takatoshi Yoshioka; Seishin Kirihara; Masao Siga; Takehiko Yoshida; Katsukuni Hisano; Toshimi Tan, and Masahiro Kobayashi, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 30, 1982, Ser. No. 363,493

Claims priority, application Japan, Apr. 3, 1981, 56-50832

Int. Cl.³ B23K *9/04, 35/30;* **F01D** *5/06, 25/16*

U.S. Cl. 428—683 **16 Claims**



1. A steam turbine rotor shaft comprising:

a main body of the rotor shaft made of a high Cr steel having a matrix of tempered martensite structure in which carbides are precipitated and consisting essentially of, by weight, 0.1 to 0.3% of C, 0.4 to 1.2 wt % of Mn, not more than 0.6 wt % of Si, not more than 1.2 wt % of Ni, 8 to 13% of Cr, 0.5 to 1.5 of Mo, 0.03 to 0.15% of Nb, 0.1 to 0.3% of V, 0.04 to 0.2% of N and the balance of Fe; and

a journal having a plurality of built-up welding layers formed successively on said main body, with the radially innermost layer having the highest Cr content and the radially outermost layer having the lowest Cr content; the outermost layer having an outer surface portion with a composition consisting essentially of, by weight, 0.01 to 0.2% of C, 0.1 to 1.0% of Si, 0.1 to 1.5% of Mn, 0.5 to 3% of Cr, not more than 1.1% of Ni, not more than 1.5% of Mo, and the balance Fe.

4,504,555

COMPOSITION AND PROCESS FOR FORMING INORGANIC RESINS AND RESULTING PRODUCT

William L. Prior, Newark, and William C. Sargeant, Bolivar, both of Ohio, assignors to Masonite Corporation, Chicago, Ill.

Filed Sep. 7, 1982, Ser. No. 415,314

Int. Cl.³ B28B *1/16;* **C04B** *9/04*

U.S. Cl. 428—689 **61 Claims**

19. A method of manufacturing a resin article comprising:

mixing two components A and B to form a mixture undergoing exothermic reaction;

directing the mixture toward a support surface capable of supporting said mixture until the reaction is completed; wherein component A comprises an aqueous solution of mono aluminum phosphate, mono magnesium phosphate or mixtures thereof having a viscosity ranging between about 700 and about 10,000 centipoises; and wherein component B comprises an aqueous vehicle; a phosphate-reactive constituent comprising wollastonite, magnesium oxide or mixtures thereof, and an essentially nonreactive aqueous phosphate dispersing agent; said component B having a viscosity permitting it to be rapidly and thoroughly mixed with component A, thereby to form a slurry which reacts exothermically to form an inorganic resin article on said support surface.

20. The method of claim **19** wherein said support surface comprises a fiberglass mat and said mixture impregnates at least an upper surface of said mat to form a fiber-reinforced article.

22. The product made by the process of claim **20**.

4,504,556

MULTICELL ELECTRIC STORAGE BATTERIES

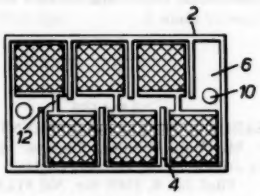
Ernest J. Pearson, Manchester, England, assignor to Chloride Group Public Limited Company, London, England

Filed Oct. 31, 1983, Ser. No. 547,227

Claims priority, application United Kingdom, Oct. 29, 1982, 8230957; Jul. 14, 1983, 8319050

Int. Cl.³ H01M *10/04*

U.S. Cl. 429—136 **47 Claims**



1. A multicell electric storage battery comprising a plurality of cells, each cell comprising a stack of alternating positive and negative battery plates interleaved with separator material, each plate in each cell being substantially in a common plane with a plate in every other cell and each plate being disposed adjacent a hypothetical median line in the respective common plane with some plates on one side and some on the other side of the median line.

4,504,557

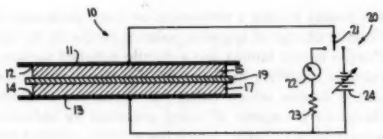
ELECTRICAL ENERGY STORAGE

George J. Filatovs, Greensboro, N.C., and John E. McGinness, Houston, Tex., assignors to MB-80 Energy Corporation, Houston, Tex.

Filed Aug. 31, 1983, Ser. No. 528,179

Int. Cl.³ H01M *4/60*

U.S. Cl. 429—192 **32 Claims**



1. A rechargeable electrical energy storage device comprising:

a first electrode;

a component of electron acceptor material coupled to said first electrode;

a second electrode;

a component of electron donor material coupled to said second electrode; and

ion-conducting solid-state barrier means coupled to both said components of electron acceptor and electron donor material for electrically separating said components and passing ions through said components;

wherein at least one of said electron donor material and electron acceptor material includes lignin, an ohmic contact material, and a reducing agent for bonding the lignin to said ohmic contact material.

4,504,558

METHOD OF COMPENSATING THE PROXIMITY EFFECT IN ELECTRON BEAM PROJECTION SYSTEMS

Harald Bohlen, Boeblingen; Helmut Engelke, Altdorf; Johann Greschner, Pliezhausen, and Peter Nehmiz, Stuttgart, all of Fed. Rep. of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 270,086, Jun. 3, 1981, Pat. No. 4,426,584.
This application Oct. 13, 1983, Ser. No. 541,741
Int. Cl.³ G03C *5/00*
U.S. Cl. 430—30 **5 Claims**

1. A method of measuring the proximity effect range in electron beam imaging, said method comprising the steps of:

(a) defining in a radiation sensitive layer, by exposing said layer to an electron beam of a predetermined dose, a test pattern consisting of a series of ridges whose widths decrease from one ridge to the next;

(b) subjecting said layer to a developing process;

(c) prematurely discontinuing the developing process;

(d) comparing the mutual symmetry in the profiles of mutually facing edges of adjacent pairs of ridges constituting said series and identifying the narrower ridge of said pairs which first exhibits assymmetry in edge profile; and

(e) measuring the width of said narrower ridge, thereby obtaining said proximate effect range.

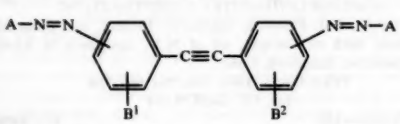
4,504,559

DISAZO COMPOUNDS AND PHOTOCONDUCTIVE COMPOSITION AS WELL AS ELECTROPHOTOGRAPHIC LIGHT SENSITIVE ELEMENT CONTAINING THE SAME

Naonori Makino; Seiji Horie; Kouichi Kawamura, and Hideo Sato, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 28, 1983, Ser. No. 546,663
Claims priority, application Japan, Oct. 28, 1982, 57-189534
Int. Cl.³ G03G *5/06*
U.S. Cl. 430—58 **15 Claims**

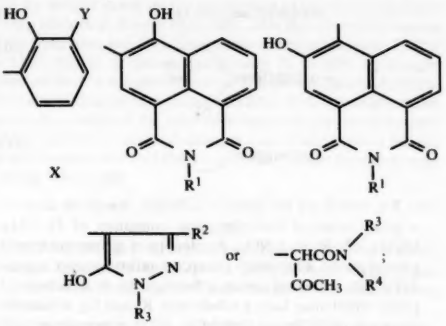
1. A photoconductive composition comprising a disazo compound represented by general formula (I):



(I)

wherein:

A represents

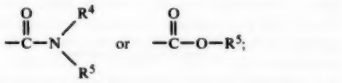


;

B^1 and B^2 each represents a hydrogen atom, an alkoxy group, a halogen atom, or a lower alkyl group

X represents an atomic group necessary to complete an aromatic ring or a heterocyclic ring, wherein said ring may be substituted or unsubstituted, by condensing with the benzene ring in the above formula to which a hydroxy group and Y are attached;

Y represents



;

R^1 represents a hydrogen atom, an alkyl group, a phenyl group or a substituted group thereof;

R^2 represents a hydrogen atom, a lower alkyl group, a carbamoyl group, a carboxyl group, an alkoxycarbonyl group, an aryloxycarbonyl group, or a substituted or unsubstituted amino group;

R^3 and R^5 each represents an alkyl group, an aromatic ring group, a heterocyclic aromatic ring group or a substituted group thereof;

R^4 represents a hydrogen atom, an alkyl group, a phenyl group or a substituted group thereof.

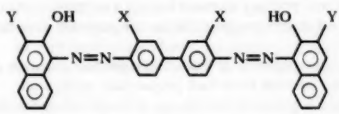
4,504,560

ELECTROPHOTOCONDUCTOR FOR ELECTROPHOTOGRAPHY COMPRISING A DISAZO COMPOUND

Osamu Takenouchi, Kitamoto; Khe Nguyen Chanh, Warabi; Tatsuo Kawara, and Hisami Tanaka, both of Tokyo, all of Japan, assignors to Dainippon Ink and Chemicals, Inc., Tokyo, Japan

Filed Dec. 12, 1983, Ser. No. 560,481
Claims priority, application Japan, Dec. 21, 1982, 57-222964
Int. Cl.³ G03G *5/06*
U.S. Cl. 430—72 **14 Claims**

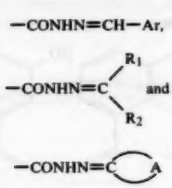
1. An electrophotoconductor comprising an electrically conductive support and formed on the surface thereof a photosensitive layer containing a disazo compound of formula



(I)

wherein

two Y's, which are the same or different, denote a group selected from the class consisting of



—CONHN=CH—Ar, (II)

(III)

and

(IV)

two X's, which are the same or different, denote an atom or a group selected from the class consisting of H, CH_3, OCH_3, Cl, Br and NO_2, Ar denotes a group such as a phenyl group, a naphthyl group, an anthryl group, a pyridyl group, a thienyl group, a furyl group or a carbazolyl group which may have a substituent, R_1 and R_2, which are the same or different, denote an alkyl group or an aryl group that may have a substituent, and

denotes a cyclic hydrocarbon group or a heterocyclic group which may have a substituent.

4,504,561

LITHIUM PEROXIDE PRIMARY ELEMENT

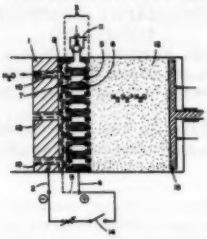
August Winsel, Kelkheim, Fed. Rep. of Germany, assignor to Varta Batterie Aktiengesellschaft, Hanover, Fed. Rep. of Germany

Filed Jul. 18, 1980, Ser. No. 169,953

Claims priority, application Fed. Rep. of Germany, Jul. 25, 1979, 2930056

Int. Cl.³ H01M 6/22

U.S. Cl. 429—101 **5 Claims**



1. A galvanic primary element having a negative light metal electrode and hydrogen peroxide as the cathode depolarizer, wherein

the hydrogen peroxide is fixated in a gel formed with polyurethane or with branched polyacrylic acid,

the hydrogen peroxide-containing gel is positioned adjacent an electrical conductor which covers the surface of the light metal electrode and

means are provided within the cell for pressing the gel against the conductor.

4,504,562

ONE-COMPONENT TYPE MAGNETIC DEVELOPER COMPRISES PARTICLES OF CUBIC MAGNETITE

Nobuhiro Miyakawa; Masanori Fujii, both of Suita, and Kouzi Maekawa, Kyoto, all of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 324,603, Nov. 24, 1981, abandoned. This application Jun. 27, 1983, Ser. No. 507,901

Claims priority, application Japan, Nov. 27, 1980, 55/168527; Dec. 2, 1980, 55/169150

Int. Cl.³ G03G 9/14

U.S. Cl. 430—106.6 **5 Claims**

1. A one-component type magnetic developer consisting essentially of a particulate shaped article of a composition comprising a binder resin comprising a homopolymer or copolymer of a vinyl aromatic monomer and/or an acrylic monomer and having a volume resistivity of at least 1×10^{15} Ω-cm and a powdery magnetic material dispersed in the binder resin medium, wherein said magnetic material comprises (A) a non-pulverizing agglomerate consisting of fine cubic magnetite particles wherein said particles of magnetite are densely aggregated with one another and the particle size distribution of said agglomerate is not substantially changed even by 5 hours' ball mill treatment, said agglomerate having a particle size of 2 to 7 μm as measured by an electron microscope, and (B) magnetite particles having a particle size of 0.1 to 0.6 μm, said agglomerate (A) and said magnetite particles (B) being present at an (A)/(B) weight ratio of from 95/5 to 10/90, said developer being obtained by kneading and pulverizing said composition and having a particle size of 5 to 35 microns, which is at least two times the number average particle size of the agglomerate, said agglomerate having a saturation magnetization of 75 to 88 emu/g and residual magnetization of 3 to 12 emu/g and a coercive force of 40 to 150 Oe, the fine magnetite (B) having an apparent density larger than 0.45 g/ml, a shape anisotropy, defined as the ratio of the maximum size to the minimum size, of from 1.0 to 5.5, and consisting of cubic particles or rounded intermediate-shape particles, and each of the agglomerate (A) and the fine magnetite (B) being present in an amount of 35 to 75% by weight based on the sum of the amount of the binder resin medium and the powdery magnetic material.

4,504,563

TONER FOR DEVELOPING ELECTROSTATIC LATENT IMAGE CONTAINING COPOLYMER OF VINYL COMPOUND AND ACID MONOMER

Koichi Tanaka; Hiroshi Takayama; Yoshimi Amagai; Shigeo Aonuma, and Yasuji Fukase, all of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Apr. 9, 1980, Ser. No. 138,949

Claims priority, application Japan, Apr. 9, 1979, 54-42117

Int. Cl.³ G03G 9/08

U.S. Cl. 430—109 **15 Claims**

1. In a toner comprising a binder and a colorant for developing an electrostatic latent image, the improvement which comprises said toner containing, as the binder, a vinyl copolymer comprising an ethylenically unsaturated monomer and a copolymerizable acid monomer, having an acid value of about 5 to 100.

4,504,564

METHOD FOR THE PREPARATION OF PHOTOCONDUCTIVE COMPOSITIONS

Damodar M. Pai, Fairport; Darlyn F. Pochan, and John M. Pochan, both of Ontario, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

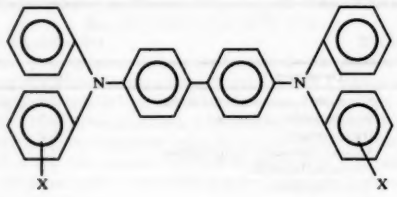
Filed Jan. 3, 1984, Ser. No. 567,719

Int. Cl.³ G03G 5/14

U.S. Cl. 430—132 **10 Claims**

1. A process for the preparation of an electrophotographic imaging member comprising providing a photoconductive layer, depositing on said photoconductive layer a coating

comprising a solution of a polycarbonate resin material having a molecular weight of from about 20,000 to about 120,000, from about 25 to about 75 percent by weight of a diamine compound based on the total weight of said polycarbonate resin, said diamine compound of one or more compounds having the general formula:



wherein X is selected from the group consisting of an alkyl group, having from 1 to about 4 carbon atoms and chlorine, a halogenated hydrocarbon solvent and a halogen free organic solvent having a boiling point greater than the boiling point of said halogenated hydrocarbon solvent, the weight ratio of said halogen free organic solvent to said halogenated hydrocarbon solvent being between about 1:99 and about 50:50, heating said coating to remove at least substantially all of said halogenated hydrocarbon solvent, said photoconductive layer exhibiting the capability of photogeneration of holes and injection of said holes and said charge transport layer being substantially non-absorbing in the spectral region at which the photoconductive layer generates and injects photogenerated holes but being capable of supporting the injection of photogenerated holes from said photoconductive layer and transporting said holes through said charge transport layer.

4,504,565

RADIATION IMAGEABLE COMPOSITIONS CONTAINING HOLLOW CERAMIC MICROSPHERES

Jon O. Baldvins, and Joseph Puleo, Jr., both of Marlborough, N.H., assignors to Markem Corporation, Keene, N.H.

Filed Apr. 17, 1984, Ser. No. 601,217

Int. Cl.[3] G03G *5/00, 5/04*

U.S. Cl. 430—138 **65 Claims**

1. A radiation imageable composition in which an image can be produced upon exposure to intense radiation, said composition comprising

(a) hollow, ceramic microspheres, and

(b) a binder material which will not be destroyed during exposure of the composition to intense radiation and will not mask the image produced upon exposure to intense radiation,

wherein the binder material has an index of refraction greater than the index of refraction of the microspheres in the absence of any other dye or pigment.

4,504,566

SINGLE EXPOSURE POSITIVE CONTACT MULTILAYER PHOTOSOLUBILIZABLE LITHO ELEMENT WITH TWO QUINONE DIAZIDE LAYERS

Thomas E. Dueber, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 438,713, Nov. 1, 1982, abandoned. This application Jun. 22, 1984, Ser. No. 623,130

Int. Cl.[3] G03C *1/495, 1/60, 1/54*

U.S. Cl. 430—156 **9 Claims**

1. A multilayer photosolubilizable litho element comprising, in order on a support, (1) a photosolubilizable solvent-soluble dye or pigment-containing layer, 0.0025 to 0.0064 mm in thickness, comprising at least one photosolubilizable quinone diazide compound in an amount of 4 to 40% by weight based on the dry weight of the layer, at least one acidic polymeric binder in an amount of 20 to 60% by weight based on the dry weight of the layer, and dye or pigment in an amount up to 50% by weight based on the dry weight of the layer, the layer having an optical density of at least 2.0 in the ultraviolet region of the spectrum, and (2) a clear photosolubilizable layer, 0.0013 to 0.005 mm in thickness, comprising 10 to 80% by weight based on the dry weight of layer of at least one photosolubilizable quinone diazide compound, and 20 to 90% by weight based on the dry weight of the layer of at least two polymeric binders having carboxylic acid substituents, one of said binders having an acid number below 110 and any other binder having an acid number below 300.

4,504,567

LIGHT-SENSITIVE LITHOGRAPHIC PRINTING PLATE

Takeshi Yamamoto, and Kiyoshi Goto, both of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 368,400, Apr. 14, 1982, abandoned. This application Aug. 9, 1984, Ser. No. 639,539

Claims priority, application Japan, Apr. 27, 1981, 56-62341

Int. Cl.[3] G03C *1/52, 1/68*

U.S. Cl. 430—165 **15 Claims**

1. A light-sensitive lithographic printing plate containing a light-sensitive composition which has a different degree of solubility in an exposed area of said printing plate than in an unexposed area of said printing plate when said printing plate is developed in an developing solution, said printing plate being produced by a process which comprises coating on a support having a metallic surface a solution prepared by dissolving a light-sensitive composition containing a light-sensitive material and at least one fluorinated surfactant having Formula (I) in a quantity of between 0.005% by weight and 0.05% by weight based on the weight of said composition, in at least one solvent having (A) a solubility parameter of at least $8(cal/cm^3)^{\frac{1}{2}}$, and (B) a boiling point within the range of from 100° to 200° C., said Formula (I) being

Rf—A—Y,

wherein Rf is a partially or completely fluorinated hydrophobic alkyl moiety, A is a single bind or a bivalent moiety and Y is a hydrophilic moiety.

4,504,568

SENSITIVE SILVER HALIDE PHOTOTHERMOGRAPHIC MATERIALS FOR PRODUCING DYE IMAGES

Bernard A. Clark, Maidenhead; Michael J. Simons, Ruislip, and Colin Holstead, Watford, all of England, assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 2, 1984, Ser. No. 576,503

Claims priority, application United Kingdom, Feb. 8, 1983, 8303472

Int. Cl.[1] G03C *1/40, 5/54, 5/26*

U.S. Cl. 430—203 **14 Claims**

11. In a dye-forming, integral diffusion transfer photothermographic element comprising, in sequence,

(A) a transparent support bearing (B) a dye mordant layer,

(C) an opacifying layer and (D) at least one photothermographic layer comprising in a binder,

(a) photographic silver halide,

(b) an image forming combination comprising

(i) a reducible organic silver salt and

(ii) a reducing agent selected from the group consisting of p-phenylenediamine, p-aminophenol, sulfonamidophenol, sulfonamidoaniline and hydrazone developing agents, and

(c) a coupler which is capable of reacting with the oxidized form of said reducing agent to form a dye, the improvement wherein

said coupler has attached to a carbon atom at the coupling position a moiety —S—Z—, wherein —Z— represents

atoms linking the sulfur atom to another position in the coupler.

4,504,569

PHOTOGRAPHIC MATERIAL WITH A TEMPORARY BARRIER LAYER COMPRISING A CHILL-GELABLE POLYMER

Edward P. Abel, Webster, and Wayne A. Bowman, Walworth, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 26, 1983, Ser. No. 526,761
Int. Cl.³ B31F 7/00; G03C 7/00
U.S. Cl. 430—214 **22 Claims**

1. A photographic element having thereon at least one dye imaging layer, a neutralizing layer, and a chill-gelable temporary barrier layer separating said dye imaging reactant layer from said neutralizing layer, said chill-gelable barrier layer comprising a chill-gelable polymer comprising about 30 to 97 weight percent of polymerized N-alkyl-substituted acrylamide, about 3 to about 25 weight percent of polymerized crosslinking monomer having at least two addition-polymerizable groups per molecule and about 0 to about 60 weight percent of one or more other polymerized addition-polymerizable monomers, said polymer having a solubility parameter δ from about 13 to 16 at 25° C. with the proviso that said monomers comprise less than 5 weight percent of cationic monomers, less than 15 weight percent of free acid monomers, and less than 3 weight percent of metal or ammonium salts of acid monomers.

4,504,570

DIRECT REVERSAL EMULSIONS AND PHOTOGRAPHIC ELEMENTS USEFUL IN IMAGE TRANSFER FILM UNITS

Francis J. Evans, Richmansworth, England; Richard L. Daubendiek, Rochester, and Ronald G. Raleigh, Brockport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 431,912, Sep. 30, 1982, abandoned, which is a continuation-in-part of Ser. No. 320,891, Nov. 12, 1981, abandoned. This application Dec. 23, 1983, Ser. No. 564,976
Int. Cl.³ G03C 1/36, 5/54
U.S. Cl. 430—217 **60 Claims**

1. A radiation-sensitive emulsion capable of forming a direct-positive image comprised of a dispersing medium, silver halide grains capable of forming an internal latent image, and a nucleating agent,

at least 50 percent of the total projected area of said silver halide grains being provided by tabular grains which have an average thickness of less than 0.5 micron and an average aspect ratio of greater than 8:1.

21. A radiation-sensitive emulsion capable of forming a direct-positive reversal dye image comprised of gelatin or a gelatin-derived peptizer, surface chemically sensitized silver bromide or bromoiodide grains capable of forming an internal latent image, a dye image former, and a nucleating agent,

at least 70 percent of the total projected area of said grains being provided by tabular grains which have an average diameter of at least 1.0 micron, an average thickness of less than 0.3 micron, and an average aspect ratio of at least 10:1, and

said emulsion when coated on a transparent film support at a silver coverage of 4 grams per square meter, exposed to a 500 watt tungsten lamp for times ranging from 0.01 to 1 second at a distance of 0.6 meter, developed for 5 minutes at 20° C. in Developer Y below, fixed, washed, and dried, having a maximum silver density at least five times the maximum density of an identical test portion which has been exposed in the same way and developed for 6 minutes at 20° C. in Developer X below, fixed, washed, and dried:

Developer X	Grams
N—methyl-p-aminophenol sulfate	2.5
Ascorbic acid	10.0
Potassium metaborate	35.0
Potassium bromide	1.0
Water to 1 liter.	

Developer Y	Grams
N—methyl-p-aminophenol sulfate	2.0
Sodium sulfite, desiccated	90.0
Hydroquinone	8.0
Sodium carbonate, monohydrate	52.5
Potassium bromide	5.0
Potassium iodide	0.5
Water to 1 liter.	

43. In a photographic image transfer film unit comprising a support,

at least one emulsion layer located on said support containing a dispersing medium, radiation-sensitive internal latent image-forming silver halide grains, and a nucleating agent,

a dye-image-providing material present in said emulsion layer or a layer adjacent thereto, and

a receiving layer for providing a viewable transferred dye image following imagewise exposure and processing of said emulsion layer,

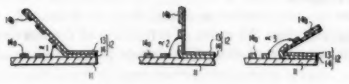
the improvement, wherein internal latent image-forming tabular silver halide grains in at least said one emulsion layer having an average thickness of less than 0.5 micron, an average diameter of at least 0.6 micron, and an average aspect ratio of greater than 8:1 account for at least 50 percent of the total projected area of said radiation-sensitive silver halide grains present in said emulsion layer.

4,504,571

METHOD OF PEEL DEVELOPMENT

Yutaka Yamamura; Tomomichi Kaneko, and Shunichi Hayashi, all of Osaka, Japan, assignors to Nitto Electric Industrial Co., Ltd., Osaka, Japan

Filed Mar. 30, 1984, Ser. No. 595,128
Claims priority, application Japan, Mar. 31, 1983, 58-57108
Int. Cl.³ G03C 1/68; G03F 7/26
U.S. Cl. 430—253 **3 Claims**



1. A method of peel development comprising:

(a) laminating an image-forming material comprising a transparent support and a photopolymerizable composition layer on the surface of a substrate on which an image is formed;

(b) imagewise exposing the image-forming material; and then

(c) peeling away the support and the unexposed areas of the photopolymerizable composition layer from the substrate to retain the exposed areas thereof on the substrate,

wherein the cohesive strength of the photopolymerizable composition layer is set such that the force required to separate the unexposed areas from the exposed areas is at least 1.0 kg/mm² and the peeling operation is performed while maintaining a peel angle (α) of the support to the substrate within the range of $0° < \alpha \leqq 90°$.

4,504,572

GELATIN SILVER HALIDE PHOTOGRAPHIC ELEMENTS FOR TANNING DEVELOPMENT

Marco Beruto; Antonio Luzzi, and Piero Ramello, all of Savona, Italy, assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Aug. 4, 1983, Ser. No. 520,501
Claims priority, application Italy, Aug. 27, 1982, 65209A/82
Int. Cl.³ G03C 1/06; G03F 7/02
U.S. Cl. 430—264 20 Claims

1. A photographic element for tanning development which comprises a base having coated thereon at least a substantially unhardened gelatin layer reactively associated with a light-sensitive silver halide emulsion, a photographically inert water-insoluble colored pigment and a tanning developer, characterized in that said element includes in addition to said tanning developer at least one non-diffusing hydroquinone dispersed in said gelatin layer.

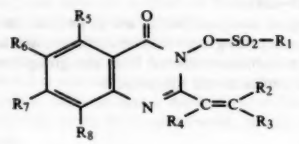
4,504,573

PHOTOPOLYMERIZABLE COMPOSITIONS

Shun-ichi Ishikawa, Shizuoka; Teruo Nagano; Koji Tamoto, both of Kanagawa, and Fumiaki Shinozaki, Shizuoka, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 22, 1984, Ser. No. 592,196
Claims priority, application Japan, Mar. 24, 1983, 58/49308
Int. Cl.³ G03C 1/68
U.S. Cl. 430—288 17 Claims

1. A photopolymerizable composition comprising a polymerizable compound having an ethylenically unsaturated bond and a photopolymerization initiator represented by general formula (I)



wherein R_1 represents an alkyl group, a substituted alkyl group, an aryl group, or a substituted aryl group; R_2 represents an alkyl group, a substituted alkyl group, an aryl group, a substituted aryl group, a heterocyclic ring, or a substituted heterocyclic ring; R_3 represents a hydrogen atom, an alkyl group, a substituted alkyl group, an aryl group, or a substituted aryl group; R_4 represents a hydrogen atom, an alkyl group, a substituted alkyl group, an aryl group, a substituted aryl group, a cyano group, a halogen atom, an alkoxy group, or an alkoxycarbonyl group; and R_5, R_6, R_7 and R_8 are independently a hydrogen atom, an alkyl group, or a substituted alkyl group, an aryl group, a substituted aryl group, a halogen atom, or an alkoxy group; or said R_5 and R_6, said R_6 and R_7, or said R_7 and R_8 are capable of combining with each other to form a benzene ring.

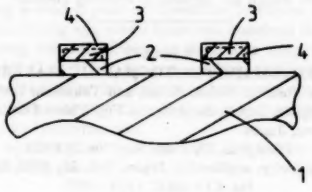
11. A photopolymerizable composition as claimed in claim 1, wherein the polymerizable compound is a compound selected from the group consisting of unsaturated carboxylic acids, salts of unsaturated carboxylic acids, esters of unsaturated carboxylic acids and aliphatic polyhydric alcohols, amides of unsaturated carboxylic acids and aliphatic polyvalent amine compounds.

4,504,574

METHOD OF FORMING A RESIST MASK RESISTANT TO PLASMA ETCHING

Joseph Meyer, Redhill, and David J. Vinton, Burgess Hill, both of England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 20, 1983, Ser. No. 496,702
Claims priority, application United Kingdom, May 26, 1982, 8215432
Int. Cl.³ G03C 5/38
U.S. Cl. 430—331 9 Claims



1. A method of forming a mask resistant to plasma etching comprising the steps of

forming a lithographically patterned layer of radiation sensitive resist on a substrate, and

exposing said patterned resist to a carbon monoxide plasma to form on the surface of said patterned resist a region having enhanced resistance to plasma etching.

4,504,575

HEAT-DEVELOPABLE FILM CONTAINING SILVER SULFONATE PHYSICAL DEVELOPER

Ross A. Lee, Webster, N.Y., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 31, 1983, Ser. No. 547,473
Int. Cl.³ G03C 1/02
U.S. Cl. 430—531 8 Claims

1. A photothermographic film comprising a silver salt as physical developer, a silver halide as photocatalyst, a reducing agent, and a binder, wherein the improvement comprises using a light-insensitive silver sulfonate as the physical developer in combination with an organic base, and wherein the silver sulfonate is silver dodecylsulfonate or silver hexadecylsulfonate.

7. A process for producing a heat-developable photothermographic film comprising the steps of;

(a) dispersing a light-insensitive silver sulfonate, a silver halide emulsion, and a chemical developing agent in a polymer latex to provide a coating composition;

(b) coating the composition on a support;

(c) drying the composition to coalesce the latex;

(d) overcoating with an organic base in a binder; and

(e) drying to produce a heat-developable film.

4,504,576

PHOTOGRAPHIC SUPPORT PAPER HAVING A SURFACE SIZE

Gregor Kemme, Osnabrück, Fed. Rep. of Germany, assignor to Felix Schoeller Jr. GmbH & Co., KG, Osnabrück, Fed. Rep. of Germany

Filed Feb. 15, 1983, Ser. No. 466,584
Int. Cl.³ G03C 1/78
U.S. Cl. 430—538 12 Claims

1. In a photographic support paper for a photographic coating containing silver salt, the support paper containing a neutral internal size and a cationic setting agent which result in the presence of photochemically disturbing compounds which cause haze in the photographic coating when deposited on the internally sized paper, the improvement wherein said inter-

nally sized paper with setting agent includes a surface size on said internally sized paper of a dried aqueous solution of at least one organic acid, organic salt or organic acid amide which is present in an amount sufficient to substantially reduce the haze which said photochemically disturbing compounds would otherwise produce in the photographic coating, said organic acid, salt or acid amide being selected from the group consisting of (A) polybasic acids, polybasic acid salts or polybasic acid amides, the acid, salt or acid amide groups of which are separated from one another by not more than 3 carbon atoms, and (B) hydroxy acids, hydroxy acid salts or hydroxy acid amides which are capable of forming chelates.

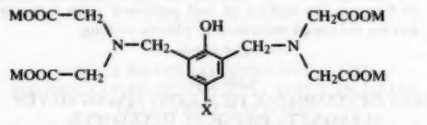
4,504,577

SILVER HALIDE PHOTOGRAPHIC MATERIALS

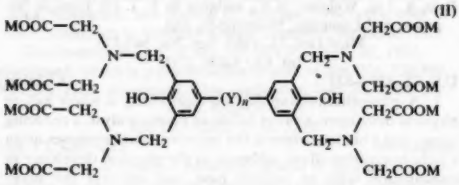
Yoshinobu Yoshida; Nobuo Sakai, and Takatoshi Ishikawa, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 27, 1984, Ser. No. 583,929
Claims priority, application Japan, Feb. 25, 1983, 58-31612
Int. Cl.[3] G03C *1/33, 1/02*
U.S. Cl. 430—564 **11 Claims**

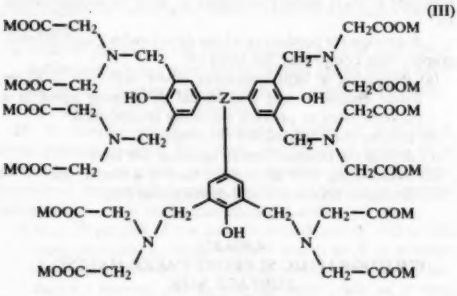
1. A silver halide photographic material comprising a support having formed thereon a light-sensitive silver halide emulsion layer, and a compound represented by a general formula selected from the group consisting of (I), (II) and (III)



(I)

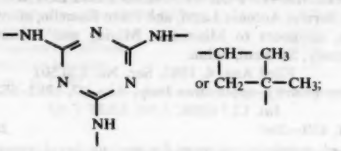


(II)



(III)

wherein X represents an alkyl group having 6 or more carbon atoms, an aryl group having 6 or more carbon atoms, an acylamino group having 7 or more carbon atoms, a heterocyclic amino group the heterocyclic moiety of which is 5- or 6-membered, a sulfonamido group having 6 or more carbon atoms, an alkoxycarbonyl group having 6 or more carbon atoms, a carbamoyl group having 6 or more carbon atoms, a sulfamoyl group having 6 or more carbon atoms, a sulfonyl group having 6 or more carbon atoms, or a 5- or 6-membered heterocyclic group; Y represents an alkylene group having 1 or more carbon atom, —SO_2—, or —CONHRoNHCO— wherein Ro represents an alkylene group having 1 or more carbon atoms; Z represents



M represents a hydrogen atom, a sodium atom, or a potassium atom; and n represents 0 or 1.

4,504,578

IN SITU FILM HARDENING WITH PYRIDINE-N-OXIDE AND ALDEHYDE PRECURSOR

Reginald A. Booker, New Castle, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 11, 1983, Ser. No. 540,775
Int. Cl.[3] G03C *1/30*
U.S. Cl. 430—621 **5 Claims**

1. A process of forming a hardened photographic film in which a layer comprised of silver halide dispersed in gelatin is coated on a support in contact with another layer and dried to form the film, characterized in that an aldehyde hardening agent is formed in situ by reacting an aldehyde precursor in one layer and a pyridine-N-oxide in an adjacent layer.

4,504,579

STABILIZED PEROXIDASE COMPOSITIONS

Ming Sun, Mundelein, Ill., assignor to Abbott Laboratories, North Chicago, Ill.

Filed Nov. 8, 1982, Ser. No. 440,130
Int. Cl.[3] C12Q *1/28;* C12N *9/96*
U.S. Cl. 435—28 **5 Claims**

1. A reagent composition for use in enzyme immunoassay techniques comprising a peroxidase conjugate and an effective amount of a stabilizer selected from the group consisting of gentamicin, amikacin and tobramycin.

4,504,580

ANTIBIOTICS PRODUCED BY FERMENTATION OF A NOVEL STRAIN OF *STREPTOMYCES HYGROSCOPICUS*

Minoru Hanada; Mitsuaki Tsunakawa, both of Tokyo; Koji Tomita, Kawasaki; Hiroshi Tsukiura, Sendai, and Hiroshi Kawaguchi, Tokyo, all of Japan, assignors to Bristol-Myers Company, New York, N.Y.

Division of Ser. No. 409,740, Aug. 19, 1982, Pat. No. 4,468,386.
This application Jun. 23, 1983, Ser. No. 507,194
Int. Cl.[3] C12P *19/44;* C12N *1/20;* C12R *1/55*
U.S. Cl. 435—74 **4 Claims**

1. A process for the preparation of antibiotic Bu-2659 complex which comprises cultivating a strain of *Streptomyces hygroscopicus* ATCC No. 39150 under submerged aerobic conditions in an aqueous nutrient medium containing assimilable sources of carbon and nitrogen at a temperature of from about 20° C. to about 43° C. until a substantial amount of Bu-2659 complex is produced and accumulated in the culture medium, and recovering the Bu-2659 complex from the culture medium.

4. A biologically pure culture of the Bu-2659 complex-producing microorganism *Streptomyces hygroscopicus* Strain No. J296-21, ATCC No. 39150.

4,504,581

METHOD FOR PRODUCING L-HISTIDINE BY FERMENTATION

Osamu Kurahashi, Kawasaki; Takayasu Tsuchida, Yokohama; Hiroki Kawashima, Kawasaki; Hitoshi Enei, Zushi, and Shigeru Nakamori, Yokohama, all of Japan, assignors to Ajinomoto Company Incorporated, Tokyo, Japan

Filed Dec. 10, 1982, Ser. No. 448,792
Claims priority, application Japan, Dec. 18, 1981, 56-204577
Int. Cl.³ C12P *13/24;* C12N *15/00;* C12R *1/125*
U.S. Cl. 435—107 14 Claims

1. A method for producing L-histidine by fermentation which comprises:

(a) aerobically culturing an L-histidine producing microorganism constructed by incorporating a recombinant plasmid DNA inserted on a DNA fragment controlling resistance to a histidine antagonist said fragment obtained form the chromosomal DNA of the mutant of the genus Bacillus which is resistant to the histidine antatonist, into a recipient strain of the genus Bacillus and

(b) recovering the L-histidine accumulated in the culture medium.

4,504,582

VERMICULITE AS A CARRIER SUPPORT FOR IMMOBILIZED BIOLOGICAL MATERIALS

Wayne E. Swann, Columbia, Md., assignor to Genex Corporation, Rockville, Md.

Continuation-in-part of Ser. No. 400,141, Jul. 20, 1982, abandoned. This application Feb. 7, 1983, Ser. No. 464,376
Int. Cl.³ C12P *13/22, 13/20;* C12N *11/14;* A61K *9/28*
U.S. Cl. 435—108 36 Claims

1. A method for immobilizing biological materials by preparing an insolubilized biological material composite comprising the steps of:

(a) adding vermiculite particles to an aqueous medium of biological material;

(b) allowing said aqueous medium of biological material to absorb into said vermiculite; and

(c) coating said vermiculite with a polymer.

19. The method of claim 1 or 4 wherein the biological material immobilized is selected from the group consisting of enzymes, microbial cells, antigens, antibodies, antibiotics, coenzymes, bacteria, yeast, fungi, plant cells, animal cells, and tissue cultures.

34. A method for producing aspartic acid comprising contacting, under aspartic acid producing conditions, a substrate containing ammonium fumarate with an insolubilized biological material composite of aspartase or aspartase containing microbial cells absorbed into vermiculite particles and immobilized within a polymer, wherein the immobilized vermiculite is cross-linked with a cross-linking agent or condensed with a condensing agent.

35. A method for producing tryptophan comprising contacting, under tryptophan producing conditions, a substrate containing indole and serine with an insolubilized biological material composite of tryptophan synthetase or tryptophan synthetase containing microbial cells absorbed into vermiculite particles and immobilized within a polymer, wherein the immobilized vermiculite is cross-linked with a cross-linking agent or condensed with a condensing agent.

36. A method for producing L-phenylalanine comprising contacting, under L-phenylalanine producing conditions, a substrate containing ammonium cinnamate with an insolubilized biological material composite of phenylalanine ammonia lyase or phenylalanine ammonia lyase-containing microbial cells absorbed into vermiculite particles and immobilized within a polymer.

4,504,583

PROCESS FOR CRYSTALLIZING EGG WHITE LYSOZYME

Mineo Hasegawa, Hachioji; Kazuya Yoshida, Fuchu; Sakae Miyauchi, Saitama, and Masami Terazono, Goka, all of Japan, assignors to Kewpie Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 30, 1982, Ser. No. 445,715
Claims priority, application Japan, Jun. 2, 1982, 57/94455
Int. Cl.³ C12N *9/36*
U.S. Cl. 435—206 9 Claims

1. A process for producing crystallized egg white lysozyme, comprising:

(a) adding a seed crystal of crystalline lysozyme to a salt solution having egg white lysozyme dissolved therein;

(b) allowing the salt solution to stand at a temperature of about 10° C. to 28° C. for at least about one hour;

(c) cooling thereafter the resulting solution to a temperature ranging from about 0° C. to 5° C. thereby crystallizing the egg white lysozyme; and

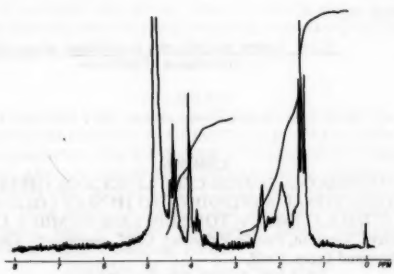
(d) then separating the thus crystallized egg white lysozyme from the solution.

4,504,584

CULTURES OF NOVEL STRAINS OF STREPTOMYCES

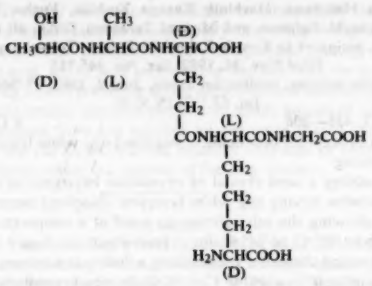
Yoshihiko Kitaura, Sakurai; Osamu Nakaguchi, Toyonaka; Keiji Hemmi; Matsuhiko Aratani, both of Suita; Hidekazu Takeno, Tenri; Satoshi Okada, Takatsuki; Hirokazu Tanaka; Masashi Hashimoto, both of Takarazuka; Yoshio Kuroda, Takatsuki; Eiko Iguchi, Osaka; Masanobu Kohsaka, Sakai; Hatsuo Aoki, Ikeda, and Hiroshi Imanaka, Osaka, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Division of Ser. No. 229,072, Jan. 28, 1981, Pat. No. 4,349,466, which is a continuation-in-part of Ser. No. 201,241, Oct. 27, 1980, Pat. No. 4,322,341, which is a continuation-in-part of Ser. No. 171,024, Jul. 22, 1980, abandoned, which is a continuation-in-part of Ser. No. 149,441, May 13, 1980, abandoned, which is a continuation-in-part of Ser. No. 147,710, May 8, 1980, abandoned, which is a continuation-in-part of Ser. No. 110,020, Jan. 7, 1980, abandoned, which is a continuation-in-part of Ser. No. 93,523, Nov. 13, 1979, Pat. No. 4,311,640. This application May 19, 1982, Ser. No. 379,851
Claims priority, application Canada, Jul. 22, 1980, 356887; Argentina, Jul. 29, 1980, 281972; Denmark, Jul. 29, 1980, 3272/80; Spain, Jul. 29, 1980, 493817; Australia, Jul. 30, 1980, 60939/80; Greece, Jul. 30, 1980, 62571; Mexico, Jul. 30, 1980, 8946; European Pat. Off., Jul. 31, 1980, 7926705; Japan, Jul. 31, 1980, 55-106279; Rep. of Korea, Jul. 31, 1980, 80-3063[U]
Int. Cl.³ C12N *1/20;* C12R *1/465*
U.S. Cl. 435—253 2 Claims



1. A biologically pure culture of the microorganism *Streptomyces olivaceogriceus,* having all the identifying characteristics of ATCC 31427, said culture being capable of producing FR-900156 in a recoverable quantity upon aerobic fermentation in an aqueous nutrient medium containing assimilable sources of

carbon, nitrogen and inorganic minerals, said FR-900156 being of the chemical structure



4,504,585

AFFINITY IMMUNOASSAY SYSTEM

Robert A. Reynolds, Escondido, Calif., assignor to Aalto Scientific, Ltd., San Marcos, Calif.

Filed Apr. 5, 1982, Ser. No. 364,031

Int. Cl.³ G01N *33/54, 33/56*

U.S. Cl. 436—518 **12 Claims**

1. The affinity immunoassay system for determining the concentration of a sample of an antigenic or haptenic analyte dissolved in a liquid medium, said system comprising the steps of bringing said sample into contact with a body of solid phase, nonimmunological, group-specific ligand in an amount in excess of the amount of ligand required to bond of all said analyte, adding to and mixing said sample with a quantity of labelled antibody monospecific to said analyte in excess of the quantity of antibody required to bind all of said analyte incubating said sample under controlled conditions of time, temperature, p.H and reagent concentration to bind substantially all of said analyte to said ligand and to bind labelled antibody to substantially all of said analyte, separating said solid phase ligand carrying bound analyte and labelled antibody from said liquid medium, measuring the label activity carried by said solid phase and comparing the label activity carried by the solid phase ligand in assay of the sample with the label activity carried by the solid phase liquid from immunoassay of a calibrator serum containing a known concentration of analyte under the same conditions used in immunoassay of the sample according to the following equation:

$$\text{Analyte, mg/dl} = \frac{\text{(Conc. Analyte in calibrator) (Absorbance of sample)}}{\text{Absorbance of calibrator}}$$

4,504,586

HYBRIDOMA TUMOR CELL LINES AND THEIR MONOCLONAL ANTIBODIES TO HUMAN COLONY STIMULATING FACTOR SUBCLASS NUMBER 1

Margery Nicolson, Pacific Palisades, Calif., assignor to Amgen, Thousand Oaks, Calif.

Filed Feb. 3, 1983, Ser. No. 463,516

Int. Cl.³ G01N *33/54, 33/56;* **C12N** *5/00, 15/00*

U.S. Cl. 436—518 **21 Claims**

1. A murine-derived hybridoma cell line capable of producing in the medium of its growth a monoclonal antibody capable of specifically binding with Colony Stimulating Factor Subclass Number 1 in an antigen/antibody complex.

4,504,587

PROCEDURE FOR IMMUNOLOGIC DETERMINATION OF PROCOLLAGEN PEPTIDE (TYPE III) AND PROCOLLAGEN PEPTIDE COL 1 (TYPE III) TOGETHER AND A PROCESS FOR PREPARING ANTI-PROCOLLAGEN PEPTIDE COL 1 (TYPE III) SERUM

Rupert Timpl, Gauting; Dietrich Brocks, Hünfelden; Horst Neubauer, Königstein, and Helmut Strecker, Pfungstadt, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed Mar. 11, 1983, Ser. No. 474,457

Claims priority, application Fed. Rep. of Germany, Mar. 13, 1982, 3209149

Int. Cl.³ G01N *33/52, 33/54, 33/56;* **A61K** *39/00*

U.S. Cl. 436—538 **16 Claims**

1. A method for the simultaneous immunologic determination of the two antigens, procollagen peptide (type III) and procollagen peptide col 1 type III), which comprises:

a. reacting a sample containing said two antigens with a specified amount of a serum containing antibodies that have affinity for both of said antigens, which specified amount of said serum contains an excess of said antibodies relative to the amount of said antigens in said sample, whereby an antigen-antibody complex is formed; and

b. quantifying the amount of said antibodies forming said antigen-antibody complex with said two antigens in said sample.

4,504,588

PROCESS FOR THE RECOVERY OF WATER-SOLUBLE HYDROFORMYLATION CATALYSTS CONTAINING RHODIUM

Roderich Gärtner; Boy Cornils, both of Dinslaken; Ludger Bexten, Hünxe, and Dieter Kupies, Duisburg, all of Fed. Rep. of Germany, assignors to Ruhrchemie Aktiengesellschaft, Fed. Rep. of Germany

Filed Sep. 20, 1983, Ser. No. 534,088

Claims priority, application Fed. Rep. of Germany, Sep. 22, 1982, 3235029

Int. Cl.³ B01J *31/40*

U.S. Cl. 502—24 **17 Claims**

1. A process for recovering a catalyst system containing water-soluble rhodium, sulfonated aryl phosphines and at least one of alkali metal, alkaline earth metal, and ammonium comprising

adding an amount of acid at least equivalent to sulfonic acid groups present in an aqueous solution of said catalyst system,

then subjecting said system to extraction with a solution of an amine in an organic solvent to form a first aqueous phase and an organic phase,

separating said organic phase from said aqueous phase,

then mixing said organic phase with an aqueous solution of an inorganic base,

whereby a second aqueous phase is formed containing purified rhodium-sulfonated aryl phosphine complex, and

separating said second aqueous phase from said organic phase.

4,504,589

HYDRODENITRIFICATION CATALYST AND A METHOD FOR IMPROVING THE ACTIVITY OF THE CATALYST

Robert C. Ryan, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Mar. 26, 1984, Ser. No. 593,061

Int. Cl.³ B01J *23/85, 23/88*

U.S. Cl. 502—66 **20 Claims**

1. A method for improving the hydrodenitrification activity of a hydroconversion catalyst which contains catalytically active amounts of Group VIII and/or Group VIB metals

incorporated into a suitable support, which comprises adding from about 0.5 to 15%w of molybdenum and/or tungsten carbonyls to said catalyst by subliming said carbonyls onto said catalyst at elevated temperature; and drying and calcining said metal carbonyl impregnated catalyst for use in a hydroconversion process.

4,504,590

CATALYSTS AND THEIR PREPARATION

Michael J. Desmond, Cleveland Heights, and Marc A. Pepera, Northfield Center, both of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Filed Dec. 27, 1982, Ser. No. 453,474

Int. Cl.³ B01J *29/14, 29/34*

U.S. Cl. 502—73 **22 Claims**

1. A catalyst composition comprising:

a medium to large port zeolite having a pore opening diameter of from about 4 Å to 10 Å, said zeolite being modified by the oxide or acid of an element selected from the group consisting of Group IIIA and VA elements; and

a Fischer-Tropsch catalyst wherein the ratio of said modified zeolite to Fischer-Tropsch component is from about 0.1 to 50:1.

11. A method for the preparation of a combination catalyst for the conversion of synthesis gas to saturated gaseous hydrocarbons comprising the steps of:

modifying a medium to large port zeolite, said zeolite having a pore opening diameter of from about 4 Å to 10 Å, with an acid or oxide of a metal selected from the group consisting of Group IIIA and VA elements; and

combining said modified zeolite with a Fischer-Tropsch catalyst in a ratio of from about 0.1 to 50:1.

4,504,591

REFRACTORY MATERIAL

Roy C. Feagin, Boca Raton, Fla., assignor to Remet Corporation, Chadwicks, N.Y.

Division of Ser. No. 246,315, Mar. 23, 1981, Pat. No. 4,415,673. This application Apr. 21, 1983, Ser. No. 487,704

The portion of the term of this patent subsequent to Nov. 15, 2000, has been disclaimed.

Int. Cl.³ C04B *35/48*

U.S. Cl. 501—102 **8 Claims**

1. A method of making a refractory casting mold comprising the steps of:

(a) making a mixture of an acid-stabilized, aqueous, colloidal zirconia sol and a refractory material, said refractory material comprising an active refractory material capable of gelling said sol after a suitable non-gel working period;

(b) applying said mixture to a pattern mold;

(c) allowing said mixture to gel on said pattern; and

(d) removing the pattern from the gelled mixture.

4,504,592

POLYMERIZATION CATALYST FOR THE PREPARATION OF ETHYLENE POLYMER

Lambertus J. M. A. van de Leemput, Echt; Godefridus A. H. Nooijen, Helden-Panningen, and Hendrikus W. van der Loo, Munstergeleen, all of Netherlands, assignors to St \micarbon, B.V., Geleen, Netherlands

Continuation of Ser. No. 418,021, Sep. 14, 1982, abandoned, which is a division of Ser. No. 261,738, May 7, 1981, Pat. No. 4,382,020. This application Dec. 13, 1983, Ser. No. 560,513

Claims priority, application Netherlands, May 7, 1980, 8002599

The portion of the term of this patent subsequent to May 3, 2000, has been disclaimed.

Int. Cl.³ B01J *23/22, 23/26*

U.S. Cl. 502—104 **1 Claim**

1. A supported chromium oxide type of catalyst for the polymerization of olefins, formed by depositing the reaction product of a chromium-1,3-diketo compound and an organometallic compound of an element from Group II or III of the periodic system on an inert organic supporting material and thereafter heating the resulting supported reaction product in a nonreducing atmosphere at a temperature of between 200° and 1200° C., said catalyst being made by the steps of:

reacting, in the presence of a solvent which is inert with respect to compounds (1), (2), and (3) hereinafter referenced,

(1) a chromium chelate of a 1,3-diketo compound, and

(2) a vanadium chelate or a vanadyl chelate of a 1,3-diketo compound,

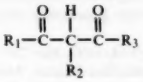
separately or jointly with

(3) an organo-metallic compound of an element from Group II or III of the periodic system in which hydrocarbyl groups with 1–20 carbon atoms are bound, via a carbon atom, to the element;

jointly contacting the resulting solution containing the reaction products of (1) and (2), with (3) with, and depositing said reaction products on, an inert inorganic supporting material; and

heating said supporting material having said reaction products deposited thereon in a non-reducing atmosphere at a temperature of between about 200° and 1200° C.;

wherein said 1,3-diketo compounds of (1) and (2) are the same or different and have the formula



in which formula R_1, R_2, and R_3 are the same or different, R_1 and R_3 being an alkyl group with 1–10 carbon atoms, and R_2 being selected from the group consisting of an alkyl group with 1–10 carbon atoms, and a hydrogen atom.

4,504,593

PROCESS FOR MANUFACTURING SUPPORTED BIMETALLIC OR PLURIMETALLIC CATALYSTS COMPRISING ONE OR MORE METALS FROM GROUP VIII AND AT LEAST ONE METAL FROM GROUP IV AND THE RESULTANT CATALYSTS THEREOF

Chan Trinh Dinh, Le Vesinet, and Jean-Paul Bournonville, Chatou, both of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

Filed Jan. 24, 1984, Ser. No. 573,279

Claims priority, application France, Jan. 24, 1983, 83 01129

Int. Cl.³ B01J *31/12, 31/28, 31/34*

U.S. Cl. 502—154 **13 Claims**

1. In a process for manufacturing a supported catalyst comprising at least one group VIII metal selected from the group consisting of platinum, palladium, nickel and cobalt, or a compound thereof and at least one metal selected from the group

consisting of germanium, tin and lead or a compound thereof, wherein at least one compound from at least one of the said group VIII metals and at least one compound of at least one metal from said germanium, tin and lead group are incorporated in a carrier, the improvement which comprises introducing said compound of a group VIII metal into the carrier as an aqueous or organic solution of a compound of said metal; drying the resultant carrier containing said solution; and introducing into resultant dried carrier said compound of a metal from said germanium, tin and lead group as a hydrocarbyl compound of said metal.

4,504,594

CATALYSTS FOR PARA-ETHYLTOLUENE DEHYDROGENATION

Chin-Chiun Chu, North Brunswick, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 15, 1982, Ser. No. 449,908

Int. Cl.³ B01J *23/78, 23/84, 23/86*

U.S. Cl. 502—184 **4 Claims**

1. In a dehydrogenation catalyst composition comprising the following components:

(a) from about 30% to 60% by weight of iron oxide, calculated as ferric oxide;

(b) from about 13% to 48% by weight of a potassium compound, calculated as potassium oxide; and

(c) from about 0% to 5% of a chromium compound, calculated as chromic oxide,

the improvement comprising combining with said components (a), (b) and (c) a modifying component (d), said modifying component (d) being capable of rendering the para-methylstyrene containing dehydrogenation reaction effluent especially resistant to the subsequent formation of popcorn polymers when the dehydrogenation of para-ethyltoluene is conducted over said modified catalyst, said modifying component (d) being a bismuth compound, said bismuth compound being present to the extent of from about 1% to 20% by weight of said catalyst composition, calculated as bismuth trioxide.

4,504,595

FLUORINATED SILICA CATALYST AND PREPARATION OF AROMATIC/ALIPHATIC NITRILES IN THE PRESENCE THEREOF

Roland Jacques, Ales; Michel Reppelin, Collonges-au-Mont-d'Or, and Laurent Seigneurin, Salindres, all of France, assignors to Rhone-Poulenc Specialites Chimiques, Courbevoie, France

Filed May 14, 1982, Ser. No. 378,192

Claims priority, application France, May 15, 1981, 81 09693

Int. Cl.³ B01J *27/10, 21/08;* **C01B** *33/12;* **C07C** *120/10*

U.S. Cl. 502—224 **10 Claims**

1. A process for the preparation of the fluorinated siliceous catalyst comprising (i) adding an aqueous solution of sodium silicate to an aqueous solution of hydrofluoric acid, the temperatures of said solutions ranging from about −5° C. to about 15° C.; (ii) maintaining an amount of SiO_2 in the resulting reaction medium of less than about 15% by weight thereof, until the pH of said reaction medium attains a value of from about 3 to about 4.5; (iii) next permitting the mixture of reaction to gel, and comminuting the hydrogel which results into grain particles; then (iv) washing said grain particles to eliminate the soluble fluoride values therefrom; and (v) drying said washed grain particles at a temperature ranging from about 150° C. to 600° C.; said catalyst having a specific surface ranging from about 200 to about 300 m^2/g, having a total pore volume ranging from about 1 to about 1.5 cm^3/g, with an average pore diameter ranging from about 100 to about 200 Å, **having an exchange pH of less than about** 3 and with the fluorine content thereof bonded to the silica, expressed in F^-, ranging from about 0.05 to about 2% by weight based upon the silica, and the sodium content thereof, expressed as Na_2O, being less than about 1% by weight also based upon the silica.

8. The process as defined by claim 1, wherein a reaction medium soluble organic carboxylic acid is added simultaneously with the hydrofluoric acid.

9. The process as defined by claim 8, wherein the molar ratio of the carboxylic acid added to the hydrofluoric acid ranges from about 0.05 to about 0.15.

4,504,596

CUPREOUS CATALYST AND PROCESS FOR MAKING SAME

George P. Schoepe, Raleigh, N.C., and Don H. Hashiguchi, University Heights, Ohio, assignors to SCM Corporation, New York, N.Y.

Filed Jan. 30, 1984, Ser. No. 574,809

Int. Cl.³ B01J *21/04, 21/06, 23/02, 23/72*

U.S. Cl. 502—225 **10 Claims**

1. In a process for making catalyst from cupreous particulates containing a major proportion of cuprous and cupric oxides and a minor proportion of elemental copper wherein a grind charge of said particulates having average particle size above 15 microns and containing up to about 10% of promoter-providing material selected from elemental aluminum and zinc, aluminum and zinc oxides, aluminum, copper and zinc chlorides, silica and aluminosilicates or 0.5% iron promoter, or below 0.05% antimony promoter is subjected to high energy comminution until the average particle size of the resulting grind is no larger than 15 microns, the improvement which comprises including in said charge about 0.05–5% of hydrated refractory metal oxide selected from hydrated alumina, hydrated oxide of titanium, hydrated oxide of zirconium and hydrated oxide of beryllium.

4,504,597

CUPREOUS CATALYST AND PROCESS MAKING SAME

Erhard Klar, Beachwood; Don H. Hashiguchi, University Heights, and Ronald J. Dietrich, Strongsville, all of Ohio, assignors to SCM Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 548,604, Nov. 4, 1983, abandoned. This application Feb. 16, 1984, Ser. No. 580,595

Int. Cl.³ B01J *21/04, 23/06, 23/72, 23/74*

U.S. Cl. 502—225 **9 Claims**

1. A process for producing catalyst from cupreous particulates containing a major proportion of cuprous and cupric oxides and a minor proportion of elemental copper which is characterized by:

providing a grind charge of said particulates having average particle size above 15 microns,

said charge containing zero to about 10% of promoter-providing material selected from the elements aluminum, zinc and iron, the oxides of aluminum, zinc and iron, the chlorides of aluminum, zinc, copper and iron, silica, aluminosilicates, or below 0.05% antimony promoter; and

subjecting said charge to high energy comminution until the average particle size of the resulting grind is no larger than 15 microns.

4,504,598

PROCESS FOR PRODUCING HONEYCOMB CATALYST FOR EXHAUST GAS CONVERSION

Tetsuji Ono, Amagasaki; Shoichi Ichihara, Toyonaka; Tomohisa Ohata, Suita, and Sadao Terui, Osaka, all of Japan, assignors to Nippon Shokubai Kagaku Kogyo Co., Ltd., Osaka, Japan

Filed May 3, 1984, Ser. No. 606,612

Claims priority, application Japan, May 12, 1983, 58-81650; Jun. 15, 1983, 58-105738

Int. Cl.³ B01J *21/04, 21/06, 23/10, 23/89*

U.S. Cl. 502—303 **3 Claims**

1. A process for producing a high-temperature resistant honeycomb catalyst for the simultaneous conversion of hydrocarbons, carbon monoxide and nitrogen oxides in an exhaust gas, which comprises admixing cerium, zirconium, at least one metal selected from the group consisting of iron and nickel, at least one metal selected from the group consisting of platinum,

palladium and rhodium, and optionally at least one metal selected from the group consisting of neodymium, lanthanum and praseodymium, each in the form of an aqueous solution or dispersion of a soluble or easily water-dispersible compound of the metal, with active alumina, drying the mixture, calcining it, dispersing the resulting catalyst composition in an aqueous medium, and depositing the dispersion on a monolithic honeycomb carrier.

4,504,599

METHOD FOR PRODUCTION OR ACTIVATION OF ANTIMONY-CONTAINING METAL OXIDE CATALYSTS

Yutaka Sasaki, and Yoshimi Nakamura, both of Kanagawa, Japan, assignors to Nitto Chemical Industry Co., Ltd., Tokyo, Japan

Filed Nov. 14, 1983, Ser. No. 551,741

Claims priority, application Japan, Nov. 12, 1982, 57-197611

Int. Cl.³ B01J *23/10, 23/18, 23/72, 23/84*

U.S. Cl. 502—304 **14 Claims**

1. A method for producing or activating antimony-containing metal oxide catalysts comprising the steps of dry blending (a) an antimony-containing metal oxide catalyst or catalyst precursor containing as essential ingredients (1) antimony and (2) at least one element selected from the group consisting of iron, cobalt, nickel, manganese, cerium, uranium, tin, titanium, and copper with (b) elemental antimony or a second antimony compound at about 300° C. to about 1000° C. in a non-reducing gas atmosphere for a period sufficient for antimony from said elemental antimony or second antimony compound (b) to deposit on said catalyst or catalyst precursor (a), wherein the apparent increase of antimony content in the antimony-containing metal oxide catalyst or catalyst precursor (a) as a result of depositing is 0.01 to 20 wt%.

4,504,600

PROCESS FOR PRODUCING ALCOHOLS USING IRON-THALLIUM CATALYSTS

Franklin J. Wright, Watchung; Michael A. Richard, Fanwood, and James C. Pirkle, Lebanon, all of N.J., assignors to Exxon Research and Engineering Co., Florham Park, N.J.

Continuation-in-part of Ser. No. 445,970, Dec. 1, 1982, abandoned, which is a continuation of Ser. No. 333,699, Dec. 23, 1981, abandoned. This application Mar. 25, 1983, Ser. No. 478,916

Int. Cl.³ C07C *1/04, 27/06*

U.S. Cl. 518—717 **17 Claims**

1. A process for producing C_6–C_{12} liquid hydrocarbons, containing C_6–C_{12} alcohols, comprising the steps of:

(a) first contacting a supported or unsupported catalyst composition comprising a mixture of iron compounds and thallium compounds, wherein the weight ratio of iron:thallium, taken as the free metals, is from about 100:1 to 1:100, with a CO/H_2 mixture in a 1:4 to 4:1 volume ratio, respectively, at 250 to 400° C., 0.1 to 10 MPa pressure and 10 to 10,000 v/v/hr, or equivalent conditions, to result in a partial, but not complete, reduction of said iron compounds to a mixture of trivalent and/or divalent iron and reduced and/or carbided iron; and

(b) continuing said contacting described in step (a) at a temperature of about 150° to 230° C. to produce C_6–C_{12} liquid hydrocarbons containing C_6–C_{12} alcohols.

4,504,601

PROCESS FOR PRODUCING PRE-FOAMED PARTICLES OF POLYPROPYLENE RESIN

Hideki Kuwabara, Hatano; Shohei Yoshimura, Tomioka; Toru Yamaguchi, Hiratsuka, and Yoshimi Sudo, Fujisawa, all of Japan, assignors to Japan Styrene Paper Corporation, Tokyo, Japan

Filed Sep. 29, 1983, Ser. No. 536,847

Claims priority, application Japan, Oct. 1, 1982, 57-172590; Jan. 20, 1983, 58-7743

Int. Cl.³ C08J *9/22*

U.S. Cl. 521—58 **9 Claims**

1. A process for producing pre-foamed particles of a polypropylene resin which comprises expanding original pre-foamed particles of a polypropylene resin, said original pre-foamed particles having the following relation

$$2 < E^{\frac{1}{3}} \times n^{\frac{1}{3}} < 45$$

wherein E is the expansion ratio of the original pre-foamed particles, and n is the number of cells per mm^2 of the cross section of the original pre-foamed particles,

by (1) including an inorganic gas, a volatile blowing agent, or a mixture of these into the original pre-foamed particles so that the internal pressure reaches 1.5 to 10 kg/cm^2 (abs), and expanding ability is imparted to the original pre-foamed particles and then heating them with a heated gas to a temperature of from the heat distortion temperature of the base resin of the pre-foamed particles, which is from 80° to 130° C., to a temperature 15° C. higher than the melting point of the base resin of the pre-foamed particles of (2) heating the original pre-foamed particles with steam to a temperature of from the heat distortion temperature of the base resin of the particles which is from 80° to 130° C. to a temperature 15° C. higher than the melting point of the base resin of the pre-foamed particles with or without imparting expanding ability thereto by including an inorganic gas, a volatile blowing agent, or a mixture of these into the original pre-foamed particles so that the internal pressure reaches 1.5 to 10 kg/cm^2 (abs), whereby pre-foamed particles having an expansion ratio higher than the original expansion ratio E are obtained.

4,504,602

SPRAYABLE ACOUSTICAL COMPOSITION

Daniel D. O'Connell, Crystal Lake, Ill., and Thomas A. Broz, Willoughby, Ohio, assignors to United States Gypsum Company, Chicago, Ill.

Division of Ser. No. 503,071, Jun. 13, 1983, , which is a continuation-in-part of Ser. No. 337,546, Jan. 6, 1982,. This application Apr. 6, 1984, Ser. No. 576,359

Int. Cl.³ C08J *9/30*

U.S. Cl. 521—78 **15 Claims**

1. A floc adaptable for spraying onto a surface to form an acoustical, textured coating thereon, said floc comprising mineral wool, polyolefin fibers, a binder, and a foaming agent.

4,504,603

FIRE-RETARDANT POLYURETHANE FOAM CONTAINING FINELY GROUND DRY FIRE RETARDANT PARTICLES CONTAINING A VOLATILE ACTIVE FIRE RETARDANT COMPONENT

Hamilton Hicks, 60 Butternut Hollow, Greenwich, Conn. 06830

Filed Sep. 23, 1983, Ser. No. 535,058

Int. Cl.³ C08G *18/14*

U.S. Cl. 521—85 **4 Claims**

1. A molded polyurethane foamed shape having finely ground dry fire retardant particles containing a volatile active fire retardant component which release fire-retardant gas when exposed to fire and distributed throughout the shape and encapsulated by the polyurethane so as to protect said component against evaporation until exposed by initial burning of the shape.

4,504,604

ENERGY ABSORBING RUBBER COMPOSITION

Mervin V. Pilkington; Jack R. Creasey, both of Akron, Ohio, and Richard H. Becken, Windsor, Vt., assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Nov. 25, 1983, Ser. No. 555,238
Int. Cl.[3] C09G 1/00
U.S. Cl. 523—167 33 Claims

1. An elastomeric composition which comprises: (1) a polynorbornene rubber, (2) a plasticizer, and (3) a hydrogenated pine tar resin.

4,504,605

FILM-FORMING OLEFINIC NITRILE POLYMER LATEX AND METHOD OF PREPARING SAME

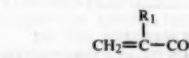
June T. Duke, Chagrin Falls; Herbert F. Mazeke, Warrensville Heights, and Dorothy C. Prem, Sagamore Hills, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Filed Dec. 20, 1982, Ser. No. 451,036
Int. Cl.[3] C08F 20/34
U.S. Cl. 523—201 31 Claims

1. A method of preparing a stable latex of a film-forming polymer containing at least 40 percent by weight of polymerized olefinically unsaturated nitrile comprising the steps of

(a) forming a main polymer core of latex particles by polymerizing in an aqueous medium a monomer mixture comprising from about 40 to 100 percent by weight of an olefinically unsaturated nitrile and from 0 to 60 percent by weight of at least one other olefinically unsaturated monomer which is copolymerizable with the nitrile, wherein the polymerization is conducted in the presence of a preformed homopolymer of a conjugated diene or a copolymer comprising a major proportion of a conjugated diene and a minor proportion of an olefinically unsaturated comonomer, and

(b) forming a polymer shell over said polymer core by polymerizing in admixture with the polymer formed in step (a), an olefinic monomer constituent comprising a major proportion of at least one acrylate monomer having the structure



wherein R is an alkyl group having from 1 to 30 carbon atoms and R_1 is hydrogen, an alkyl group having from 1 to 8 carbon atoms or a halogen, and from about 1 to about 40 percent by weight of an olefinically unsaturated nitrile.

4,504,606

THERMOSETTING COATING COMPOSITION—I

Panagiotis I. Kordomenos, Mt. Clemens, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 27, 1983, Ser. No. 565,800
Int. Cl.[3] C08L 61/32, 63/02; C09D 3/52, 3/58
U.S. Cl. 523—400 22 Claims

1. An organic solvent based thermosetting composition comprising:

(A) crosslinkable hydroxy functional epoxy ester resin having a number average molecular weight (Mn) between about 1,000 and about 5,000, said resin comprising the reaction product of diepoxide chain extended with diphenol and chain terminated with acid component comprising hydroxy functional acid; and

(B) polyfunctional, hydroxy-reactive crosslinking agent selected from aminoplast crosslinking agent, blocked polyisocyanate crosslinking agent comprising at least two isocyanate groups blocked by reaction with an active hydrogen bearing blocking agent, and a compatible mixture of any of them, said crosslinking agent being included in an amount such that at the cure temperature of the composition said crosslinking agent will provide between about 0.5 and about 1.6 hydroxy reactive groups per hydroxy group contributed by said epoxy ester resin.

4,504,607

EPOXY RESIN COATING COMPOSITION FOR PRINTED CIRCUIT BOARDS

Edward J. Leech, Oyster Bay, N.Y., assignor to Kollmorgen Technologies Corporation, Dallas, Tex.

Continuation of Ser. No. 103,340, Dec. 13, 1979, abandoned, which is a continuation-in-part of Ser. No. 3,099, Jan. 12, 1979, abandoned. This application Jul. 22, 1982, Ser. No. 401,153
Int. Cl.[3] C08L 63/00, 63/10
U.S. Cl. 523—427 21 Claims

1. In a permanent, protective coating composition useful in the manufacture of printed circuit boards, the composition being comprised of a thermosetting resin and a curing agent dissolved in a solvent; a flow promoter; and a thickening agent, said curing agent being present in an amount sufficient to effect substantially complete cure of said thermosetting resin, said coating composition being in an initial state as a high viscosity solution or in a soft gel-like phase, and having an apparent viscosity between about 10,000 centipoise and about 200,000 centipoise, said coating composition upon curing being transformed from said initial state into a final state as a solid phase, the improvement which comprises:

said thermosetting resin being a solid epoxy resin at room temperature, having a melting point between about 60° C. and about 200° C., and having an average epoxide functionality greater than about 3 and sufficient to permit rapid cross-linking of said thermosetting resin into a solid without melting and liquifying of said thermosetting resin; said thermosetting resin comprising more than about 10 weight percent and less than about 80 weight percent of said coating composition; and said thickening agent comprising about 1 to about 5 weight percent of the epoxy resin solids content of said coating composition.

4,504,608

FLAME RETARDANT POLYESTER RESIN COMPOSITIONS

Kazuo Kishida; Isao Sasaki, both of Hiroshima, and Hiroshi Mori, Yamaguchi, all of Japan, assignors to Mitsubishi Rayon Co. Ltd., Tokyo, Japan

Filed Jan. 26, 1983, Ser. No. 461,228
Claims priority, application Japan, Feb. 4, 1982, 57-16685
Int. Cl.[3] C08L 67/02, 63/02
U.S. Cl. 523—444 10 Claims

1. A flame retardant glass fiber reinforced polyester resin composition comprising:

A. 100 parts by weight of polyethylene terephthalate resin;

B. from about 1 to about 20 parts by weight of a first flame retardant component of the formula (I);

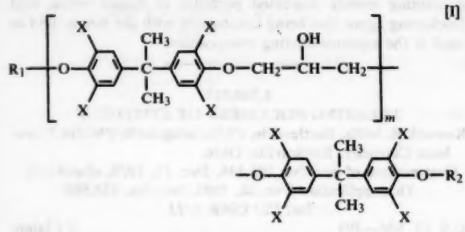
C. from about 2 to about 30 parts by weight of a second flame retardant component of the formula (II);

provided that the first and second fire retardant components are blended together so that the weight ratio of (I)/(II) is in the range of $0.2 < (I)/(II) \leqq 4$, and further that the total of the first and second flame retardant components (I) and (II) is from about 3 to about 40 parts by weight;

D. from about 2 to about 30 parts by weight of antimony trioxide, and

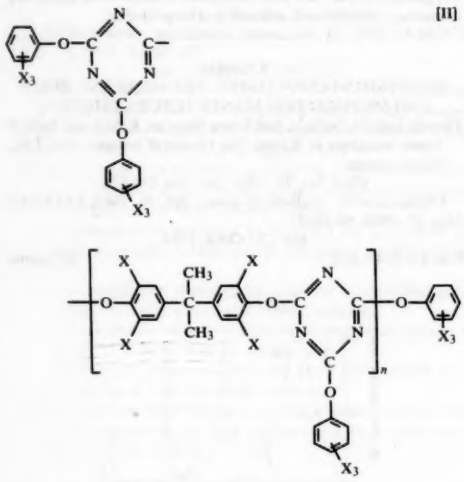
E. from about 5 to about 60 percent by weight of glass fiber based upon the total amount of the resin composition, the first flame retardant component is represented by the formula (I):

[I]



in which X represents hydrogen, chlorine or bromine and m has an average value from 0 to 11 and the halogen content is at least 10 percent by weight of the component, and R_1 and R_2 are both glycidyl groups; and the second flame retardant component is represented by the formula (II);

[II]



in which X represents hydrogen, chlorine or bromine and n has an average value from 0 to 7 and the halogen content is at least 10 percent by weight of the component.

4,504,609

AQUEOUS COATING COMPOSITION

Teruaki Kuwajima, Osaka; Hiroshi Miwa, Hyogo; Katsuaki Kida, Osaka, and Shinichi Ishikura, Kyoto, all of Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan

Filed Oct. 3, 1983, Ser. No. 538,653

Claims priority, application Japan, Oct. 4, 1982, 57-174891; Oct. 4, 1982, 57-174892

Int. Cl.³ C09D *5/02, 3/66, 3/80, 3/81*

U.S. Cl. 523—501 **6 Claims**

1. An aqueous coating composition comprising:

(A) at least one aqueous resin selected from the group consisting of acryl resins, alkyd resins, polyester resins, acryl-modified alkyd resins and acryl-modified polyester resins and

(B) at least one component selected from water-insoluble resinous particles having an average grain diameter of 0.01–0.1μ, obtained by polymerization of at least one ethylenically unsaturated compound,

the solid weight ratio of said (A) to (B) being 99:1–15:85.

4,504,610

SELF-EXTINGUISHING POLYMERIC COMPOSITIONS

Renzo Fontanelli; Gianluigi Landoni, both of Milan, and Giovanni Legnani, Saronno, all of Italy, assignors to Montedison S.p.A., Milan, Italy

Filed Feb. 7, 1984, Ser. No. 577,891

Claims priority, application Italy, Feb. 7, 1983, 19452 A/83

Int. Cl.³ C08K *5/35, 5/34*

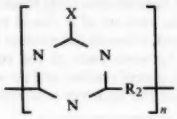
U.S. Cl. 524—96 **11 Claims**

1. Self-extinguishing polymeric compositions based on thermoplastic polymers, comprising, for 100 parts by weight of total compositions:

(1) from 10 to 20 parts by weight of an ammonium phosphate or an amine phosphate; and

(2) from 5 to 8 parts by weight of a nitrogenous water-insoluble compound, consisting of an oligomer or a polymer of a 1,3,5-triazine derivative, and having the general formula:

(I)



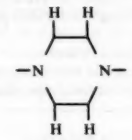
wherein

X=a group of formula

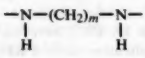
or a heterocyclic group containing at least a nitrogen atom in the ring, and linked to the triazinic ring through one of such nitrogen atoms,

R_1=an alkyl containing from 1 to 20 carbon atoms, or a cycloalkyl containing from 6 to 20 carbon atoms,

R_2=a divalent radical of piperazine of the type



or a divalent radical of the type



n=an integer from 2 to 50, extremes included;

m=an integer from 2 to 6, extremes included.

4,504,611

FLAME RETARDANT POLYAMIDE COMPOSITIONS

Charles S. Ilardo, Tonawanda, and James J. Duffy, Buffalo, both of N.Y., assignors to Occidental Chemical Corporation, Niagara Falls, N.Y.

Filed Aug. 1, 1983, Ser. No. 519,277

Int. Cl.³ C08K *5/34*

U.S. Cl. 524—101 **7 Claims**

1. A flame retardant polyamide composition comprising

(a) about 35 to about 76 percent polyamide;

(b) about 6 to about 10 percent zinc borate;

(c) about 10 to about 15 percent melamine cyanurate,

(d) about 0 to about 35 percent fiberglass;

(e) about 0 to about 3 percent of antimony trioxide,

(f) about 8 to about 15 percent of bis(hexachlorocyclopentadieno)cyclooctane,

wherein the percentages are based on the total weight of components (a) through (f).

4,504,612

POLYESTER ANTIFUME ADDITIVE FOR SPANDEX FIBER

Charles C. Ketterer, Waynesboro, Va., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sep. 26, 1983, Ser. No. 535,687
Int. Cl.[3] D02G 3/00; B32B 27/40
U.S. Cl. 524—101 10 Claims

1. In a polyether-based spandex fiber containing a saturated aliphatic ester, the improvement comprising a saturated aliphatic polyester in an amount effective in reducing fume-induced discoloration, the amount being no more than 10% by weight of the fiber and the polyester having a number average molecular weight of greater than 600 and less than 10,000 and a repeating unit which has the structural form of a residue of a glycol reacted with the residue of a diacid or the form of a residue of a hydroxy acid, wherein the number of carbon atoms in the shortest chain between ends of the residues is in the range of 3 to 10 for the glycol residue and no more than 12 for the diacid residue or for the hydroxy acid residue.

4,504,613

POLYPHENYLENE ETHER RESIN COMPOSITIONS HAVING IMPROVED DUCTILE IMPACT STRENGTH

Visvaldis Abolins, Delmar, and Fred F. Holub, Schenectady, both of N.Y., assignors to General Electric Company, Pittsfield, Mass.

Filed Aug. 19, 1983, Ser. No. 524,824
Int. Cl.[3] C08K 5/53; C08L 71/04
U.S. Cl. 524—125 28 Claims

1. A flame retardant thermoplastic composition, comprising

(a) a polyphenylene ether resin;

(b) an alkenyl aromatic polymer;

(c) a ductile impact strength improving amount of an additive selected from the group consisting of

(1) a high molecular weight polyfunctional ester,

(2) a low molecular weight saturated polyneopentyl polyester, and

(3) a mixture of (1) and (2); and

(d) an effective amount of a non-halogenated flame retardant agent comprising an organic phosphate.

4,504,614

METHOD OF THICKENING AQUEOUS LATEX COMPOSITIONS

John C. Padget, Frodsham, England, assignor to Imperial Chemical Industries PLC, London, England

Filed Sep. 19, 1983, Ser. No. 533,815
Claims priority, application United Kingdom, Oct. 21, 1982, 8230051; Jun. 30, 1983, 8317803
Int. Cl.[3] C08K 3/36
U.S. Cl. 524—284 22 Claims

1. A method of thickening an acidic aqueous coating composition comprising tannic acid and a latex of a film-forming polymer which composition is substantially free from non-ionic surfactants, wherein a water-soluble thickening agent for the aqueous latex which is non-complexing with tannic acid is incorporated into the aqueous coating composition in the form of a gel-like aqueous dispersion containing evenly dispersed particles of fumed silica, said thickening agent also being compatible with the tannic acid as used in the aqueous coating composition.

12. A thickened acid aqueous coating composition comprising tannic acid and a latex of a film-forming polymer which composition is substantially free from non-ionic surfactants wherein the aqueous coating composition has been thickened with a thickening composition comprising a gel-like aqueous dispersion comprising a water-soluble thickening agent for the aqueous latex which is non-complexing with tannic acid and containing evenly dispersed particles of fumed silica, said thickening agent also being compatible with the tannic acid as used in the aqueous coating composition.

4,504,615

TREATING POLYMERS OF ETHYLENE

Kenneth R. Mills, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation of Ser. No. 106,346, Dec. 21, 1979, abandoned.
This application Dec. 28, 1981, Ser. No. 334,506
Int. Cl.[3] C08K 5/13
U.S. Cl. 524—291 7 Claims

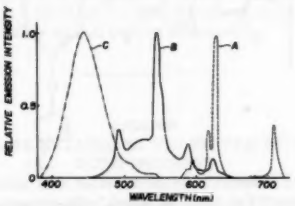
1. A method for preparing compositions containing a polymer of ethylene to reduce discoloration upon processing at elevated temperature, said method comprising admixing with a polymer of ethylene produced using chromium oxide catalyst before completion of processing at elevated temperature a combination of compounds consisting essentially of (1) a hindered phenolic stabilizer consisting of carbon, hydrogen and oxygen and (2) at least one compound chosen from the group consisting of methanol, ethanol and isopropanol.

4,504,616

NEODYMIUM-CONTAINING TRANSPARENT RESIN AND METHOD FOR MANUFACTURE THEREOF

Hiroshi Uehara, Nakajo, and Tohru Shimizu, Kokubunji, both of Japan, assignors to Kyowa Gas Chemical Industry Co., Ltd., Tokyo, Japan

Filed Jul. 28, 1983, Ser. No. 518,078
Claims priority, application Japan, Jul. 30, 1982, 57-132119; May 25, 1983, 58-90607
Int. Cl.[3] C08K 5/09
U.S. Cl. 524—398 18 Claims



1. An neodymium-containing transparent resin obtained by polymerizing a monomeric mixture comprising (A) a blend of (i) at least one monomer selected from the group consisting of alkyl methacrylates having alkyl groups of 1 to 4 carbon atoms and styrene with (ii) at least one copolymerizable unsaturated carboxylic acid monomer or a salt thereof selected from the group consisting of acrylic acid, methacrylic acid and neodymium salts thereof and (B) at least one compound selected from the group consisting of saturated or unsaturated organic carboxylic acids substituted or unsubstituted with a hydroxyl group and having 6 to 21 carbon atoms, and neodymium salts thereof, which transparent resin is characterized by having a neodymium content in the range of 0.3 to 20% by weight, having the number of carboxyl groups possessed by said organic carboxylic acids and salts thereof in a ratio of x to the total number of carboxyl groups possessed by the acrylic acid, methacrylic acid and salt units thereof present in said copolymer and carboxyl groups possessed by said organic carboxylic acids and salts thereof and having the number of carboxyl groups participating in neutralization of neodymium and consequent formation of a salt thereof in a ratio of y to said total number of carboxyl groups, and having the values of x and y satisfy any of the following formulas I, II and III.

$$0.05 \leqq y \leqq (5/2)x + 0.2 \quad (I)$$
$$0 \leqq x \leqq 0.3$$

$$0.05 \leqq y \leqq -(2/5)(x - 0.3) + 0.95 \quad (II)$$
$$0.3 \leqq x \leqq 0.55$$

$$0.05 \leqq y \leqq -(8/3)(x - 0.55) + 0.85 \quad (III)$$
$$0.55 \leqq x \leqq 0.85$$

4,504,617

INORGANIC FILLER CONTAINING PROPYLENE POLYMER COMPOSITIONS

Hiroshi Yui; Yoshihiro Sobajima; Osamu Higashide; Tsuyoshi Imamura; Michiya Okamura, and Satoru Hattori, all of Mie, Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

Filed Sep. 16, 1982, Ser. No. 418,963

Claims priority, application Japan, Sep. 16, 1981, 56-145974; Dec. 22, 1981, 56-207626

Int. Cl.³ C08K *3/36, 3/26*

U.S. Cl. 524—426 **22 Claims**

1. An inorganic filler containing propylene polymer composition which comprises 25 to 90% by weight of component (A) and 75 to 10% by weight of component (B):

(A) at least one member selected from the group consisting of

(a) a crystalline propylene copolymer composed of propylene and one or more other α-olefins;

(b) a composition prepared by blending the copolymer (a) with a synthetic rubber and/or crystalline polypropylene; and

(c) a composition prepared by blending a crystalline polypropylene with a synthetic rubber, wherein

(1) the amount of xylene extractable soluble component at 23° C. is 10 to 50% by weight, and

(2) the propylene content in the extractable soluble component is 30% by weight or more,

(B) an inorganic filler having an average particle size of 200μ or less, measured by light transmission in a liquid-phase sedimentation system.

4,504,618

AQUEOUS DISPERSIONS

Antony J. Irvine, Maidenhead, England; Bruce Leary, and Christopher H. Such, both of Mount Eliza, Australia, assignors to Dulux Australia Ltd., Melbourne, Australia

Filed Jul. 11, 1983, Ser. No. 512,675

Claims priority, application Australia, Jul. 12, 1982, PF4808

Int. Cl.³ C08J *3/02;* **C08K** *3/20*

U.S. Cl. 524—457 **6 Claims**

1. An aqueous dispersion of particles of film-forming addition polymer wherein the polymer is a copolymer of at least two ethylenically unsaturated monomers, characterised in that:

(a) at least one comonomer is an amphipathic monomer having an HLB value of at least 8 and consisting of a lipophilic component and a hydrophilic component, the hydrophilic component being non-ionic, and the lipophilic component having a molecular weight of at least 100, comprising at least one ethylenic double bond; and lacking acrylyl or methacrylyl residues; and

(b) at least one comonomer is non-amphipathic;

(c) said amphipathic comonomer comprising up to 80% by weight of the copolymer.

4,504,619

IRIMELLITIC ANHYDRIDE-CONTAINING UNSATURATED POLYESTERS

Robert C. Chang, Newark, and Dale E. McCoy, Granville, both of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Continuation of Ser. No. 65,798, Aug. 13, 1979, abandoned. This application Aug. 25, 1980, Ser. No. 180,762

Int. Cl.³ C08L *67/06;* **D02G** *3/00*

U.S. Cl. 524—524 **10 Claims**

1. A glass sizing composition comprising a water-insoluble polyester, polyvinyl acetate and a polyethylene emulsion, said polyester being produced by reacting a glycol and a dibasic acid to form a condensation product and reacting said condensation product with maleic anhydride and trimellitic anhydride.

8. At least one glass fiber having at least a portion of its surface in contact with the residue formed upon removal of water from the composition of claim 1.

10. A sheet molding composition comprising the glass fibers of claim 8.

4,504,620

OXAZOLINE POLYESTER OLIGOMERS

Stephen L. Cluff, Baton Rouge, La., and Clifford H. Strolle, Springfield, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 16, 1984, Ser. No. 600,966

Int. Cl.³ C08L *77/10;* **C08G** *63/68*

U.S. Cl. 524—602 **10 Claims**

7. In an enamel comprising film-forming polymer and solvent, the improvement wherein the enamel further comprises about from 1 to 20%, by weight of the polymer, of an oxazoline polyester having a molecular weight of about from 500 to 10,000 and prepared from (a) at least one monocarboxylic acid of up to 18 carbon atoms, (b) at least one dicarboxylic acid or anhydride having from 2 to 30 carbon atoms, (c) at least one glycol having up to 8 carbon atoms, and (d) a tris-hydroxyalkyl amino methane, the alkyl groups of which have from 1 to 3 carbon atoms, and wherein the resulting oxazoline polyester contains about from 4 to 20% oxazoline units, based on the weight of the oxazoline polyester.

4,504,621

CLAY FILLED SILICONE ELASTOMERIC EMULSIONS

Harold V. Lefler, III, Sanford, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Dec. 28, 1983, Ser. No. 566,241

Int. Cl.³ C08K *3/22;* **C08L** *83/06*

U.S. Cl. 524—783 **6 Claims**

1. An aqueous silicone elastomeric emulsion consisting essentially of

(A) 100 parts by weight based upon the solids content of an anionically stabilized, hydroxyl endblocked polydiorganosiloxane, present as an oil-in-water emulsion which has a solids content of greater than 50 percent by weight,

(B) from 1 to 50 parts by weight of colloidal silica,

(C) from 0.1 to 2 parts by weight of alkyl tin salt,

(D) from 20 to 150 parts by weight of clay, and

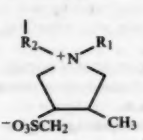
(E) greater than 2 parts by weight of zinc oxide, the silicone elastomeric emulsion having a pH of 9 to 11.5 inclusive and a viscosity which makes it suitable as a caulking material, said elastomeric emulsion having been aged for a time period such that an elastomeric product is formed upon removal of the water under ambient conditions.

4,504,622
POLYMERIC PYRROLIDINIUM METHANESULFONATE VISCOSIFIERS AND METHOD FOR MANUFACTURE

Kirk D. Schmitt, Pennington, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 373,553, Apr. 30, 1982,. This application Aug. 31, 1982, Ser. No. 413,574
Int. Cl.[3] C08F 8/34, 8/32
U.S. Cl. 525—61 7 Claims

1. A polymeric sulfonate comprising a polymeric polyvinyl alcohol backbone having side chain groups of the formula

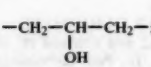


(I)

where:

(i) R_1 is CH_3, CH_2CH_3, CH_2CH_2OH, propyl, butyl or phenyl;

(ii) R_2 is $(CH_2)_n$ or



and

(iii) n is 1–5.

4,504,623
PROCESS OF PREPARING A POLYMER MIXTURE COMPRISING POLYVINYL CHLORIDE, A POLYCARBONATE AND A RUBBER LIKE POLYMER

Jean M. H. Heuschen, Halsteren; Jan Bussink, Bergen op Zoom, and Willem L. Sederel, Roosendaal, all of Netherlands, assignors to General Electric Company, Mt. Vernon, Ind.

Filed Dec. 9, 1983, Ser. No. 559,767
Claims priority, application Netherlands, Feb. 14, 1983, 8300538
Int. Cl.[3] C08L 69/00
U.S. Cl. 525—67 7 Claims

1. A method of preparing a polymer mixture comprising polyvinyl chloride, an aromatic polycarbonate and a rubber like polymeric, characterized in that first a premixture comprising 60–90% by weight of aromatic polycarbonate and 10–40% by weight of rubber like polymer is prepared by mixing at a temperature above about 220° C., after which the resulting premixture is cooled to a temperature below about 220° C. and is mixed with the polyvinyl chloride.

4,504,624
COMPOSITION AND PROCESS

Jean M. H. Heuschen, Halsteren; Jan Bussink, Bergen op Zoom, and Willem L. Sederel, Roosendaal, all of Netherlands, assignors to General Electric Company, Mt. Vernon, Ind.

Filed Dec. 9, 1983, Ser. No. 559,778
Claims priority, application Netherlands, Feb. 14, 1983, 8300537
Int. Cl.[3] C08L 69/00
U.S. Cl. 525—67 6 Claims

1. A polymer mixture comprising polyvinyl chloride, an aromatic polycarbonate and a rubber like polymer, characterized in that the rubber like polymer is a graft copolymer which is built up from a rubber like main chain with predominantly alkyl acrylate units on which styrene, α-methylstyrene, acrylonitrile, methacrylic acid esters, acrylic acid esters or mixtures thereof have been grafted.

4,504,625
THERMOPLASTIC RESIN COMPOSITION CONTAINING IMINATED COPOLYMER

Tomoyuki Kitsunai; Kiyotaka Saito, both of Machida, and Shozo Hori, Ayase, all of Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 4, 1982, Ser. No. 385,203
Claims priority, application Japan, Dec. 11, 1981, 56-199720
Int. Cl.[3] C08L 51/04, 53/00, 25/04, 25/12
U.S. Cl. 525—71 18 Claims

1. A thermoplastic resin composition comprising:

10 to 90 wt % of an iminated copolymer (Component A) prepared by reacting a nitrogen compound selected from the group consisting of ammonia and a primary amine with a graft copolymerization product obtained by graft-copolymerizing 3 to 40 wt % of a rubber-like polymer, the content of gel in said rubber-like polymer being not more than 5% by weight and the glass transition temperature thereof being below — (minus) 20° C., with 60 to 97 wt % of a monomer mixture consisting essentially of 50 to 95 wt % of an aromatic vinyl monomer, 5 to 50 wt % of an unsaturated dicarboxylic acid anhydride and 0 to 30 wt % of a vinyl monomer copolymerizable with said aromatic vinyl monomer and said unsaturated dicarboxylic acid anhydride; and

10 to 90 wt % of a graft-copolymer (Component B) obtained by graft-copolymerizing 3 to 80 wt % of a rubber-like polymer with 20 to 97 wt % of a monomer mixture consisting essentially of 40 to 100 wt % of an aromatic vinyl monomer, 0 to 40 wt % of a cyanated vinyl monomer and 0 to 40 wt % of a vinyl monomer copolymerizable with said aromatic vinyl monomer and said cyanated vinyl monomer and/or 0 to 80 wt % of a polymer (Component C) obtained by polymerizing 40 to 100 wt % of an aromatic vinyl monomer, 0 to 40 wt % of a cyanated vinyl monomer and 0 to 40 wt % of a vinyl monomer copolymerizable with said aromatic vinyl monomer and said cyanated vinyl monomer wherein the total weight percent of the sum of Component A, Component B and Component C is equal to 100%.

4,504,626
POLYCARBONATE RESIN MIXTURES

Ping Y. Liu, Naperville, Ill., assignor to General Electric Company, Mt. Vernon, Ind.

Filed Sep. 23, 1982, Ser. No. 421,786
Int. Cl.[3] C08L 23/00, 23/04, 23/10, 69/00
U.S. Cl. 525—133 9 Claims

1. A resin mixture comprising

(a) an aromatic polycarbonate resin, and

(b) a modifier combination therefor comprising

(i) a thermoplastic olefin polymer insoluble in said polycarbonate resin excluding a linear low density polyolefin; and

(ii) a linear low density polyolefin resin,

said modifier being present in an amount sufficient to impart to said mixture a resistance to environmental stress crazing and cracking greater than that possessed by said polycarbonate resin (a) alone, and enhanced weld line strength compared to polycarbonate resin plus (b)(i) wherein said component (a) comprises from 84 to about 96 parts by weight, component (b)(i) comprises from about 2 to about 8 parts by weight and component (b)(ii) comprises from about 2 to about 8 parts by weight, per 100 parts by weight of components (a), (b)(i) and (b)(ii) combined.

4,504,627

METHYLMETHACRYLATE/N-PHENYLMALEIMIDE COPOLYMER-CONTAINING POLYMER ALLOYS

Barry D. Dean, Springfield, Pa., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Sep. 12, 1983, Ser. No. 531,318
Int. Cl.³ C08L *39/04*
U.S. Cl. 525—205 **11 Claims**

1. A polymer alloy comprising a first and a second polymer wherein,

(a) the first polymer is a random copolymer consisting essentially of recurring units of methylmethacrylate and recurring units of N-phenylmaleimide; and

(b) the second polymer is a random copolymer or terpolymer of recurring units of styrene, recurring units of from about 5 to about 35 weight percent acrylonitrile, and, 0 to 7 weight percent of recurring units of N-phenylmaleimide.

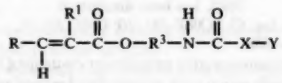
4,504,628

POLYMERIZABLE UV LIGHT STABILIZERS FROM ISOCYANATOALKYL ESTERS OF UNSATURATED CARBOXYLIC ACIDS

Mark R. Johnson, Breckenridge, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 344,838, Feb. 1, 1982, abandoned. This application Apr. 14, 1983, Ser. No. 484,793
Int. Cl.³ C07C *125/04;* **C07D** *253/08;* **C08F** *279/02, 246/00, 236/06, 226/06, 222/22;* **C08K** *5/16, 5/21, 5/34*
U.S. Cl. 525—278 **15 Claims**

1. A vinyl polymerizable UV light stabilizer comprising a compound of the formula:



in which R is H or CH_3; R^1 is H or CH_3; R and R^1, are all such that the C=C double bond is vinyl polymerizable, R^3 is a C_1–C_5 alkyl radical, X is a linkage derived from the active isocyanate group reacted with an organic hydroxyl group or other active hydrogen moiety pendent from a UV light stabilizer; and Y is a UV light stabilizer.

8. A polymeric composition comprising the copolymer of an addition polymerizable organic compound and the UV light stabilizer of claim 1 wherein the UV light stabilizer has been copolymerized with the organic compound.

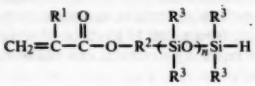
4,504,629

POLYMERS WITH GRAFT α-ALKYLACRYLATE FUNCTIONALITY

Samuel Q. S. Lien, South Windsor (now by change of name from Qcheng S. Lien), and Steven T. Nakos, East Hartford, both of Conn., assignors to Loctite Corporation, Newington, Conn.

Filed Jul. 20, 1983, Ser. No. 515,702
Int. Cl.³ C08F *275/00*
U.S. Cl. 525—288 **16 Claims**

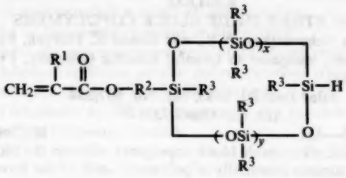
1. A method of adding α-alkylacrylate functionality to an aliphatically unsaturated polymer, the method comprising reacting at temperatures between about 0° C. and about 100° C. a grafting agent consisting essentially of a compound selected from (A), (B) and mixtures thereof with said aliphatically unsaturated polymer in the presence of a hydrosilation catalyst selected from platinum-based catalysts and rhodium complex catalysts, said grafting agent compounds (A) and (B) having the respective structures:



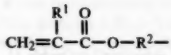
(A)

-continued

and



where R^1 is an alkyl group; R^2 is a divalent group nonreactive under hydrosilation conditions; n is 0, 1, 2, 3, or 4; x and y are 0, 1, 2, 3 or 4 and x+y=1, 2, 3 or 4; and, the R^3 groups are the same or different alkyl, substituted alkyl, aryl, substituted aryl or



groups.

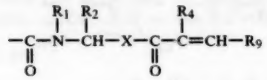
4,504,630

ACRYLIC POLYMERS AND THE MICHAEL ADDUCTS THEREOF USEFUL IN COATING APPLICATIONS

Buchwalter Stephen L., Allison Park, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 159,578, Jun. 16, 1980, Pat. No. 4,330,640. This application Sep. 28, 1981, Ser. No. 305,866
Int. Cl.³ C08F *265/10*
U.S. Cl. 525—296 **6 Claims**

1. A non-gelled film-forming polymer characterized by at least one pendant group of the formula:



wherein R_1, R_2, R_4, and R_9, each independently, is a hydrogen or an alkyl group containing from about 1 to about 6 carbon atoms; and wherein X represents a moiety

of which R_3 is a hydrogen, or an alkyl group containing from about 1 to 6 carbon atoms, or a moiety —O—R_{10}—O— of which R_{10} is an alkylene group containing from about 2 to 6 carbon atoms.

4,504,631

PHOTORESIST MATERIAL

Hideaki Doi; Kenichi Kokubun; Teruo Sakagami, and Naohiro Murayama, all of Fukushima, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 31, 1983, Ser. No. 499,486
Int. Cl.³ C08F *8/24*
U.S. Cl. 525—327.3 **14 Claims**

1. A photoresist material comprising:

a polymer having chloromethyl groups attached thereto and containing 2-isopropenylnaphthalene as at least one polymerized component thereof, the average substitution degree of said chloromethyl groups based on said polymer being within the range of 0.2 to 5, the polymer containing

polymerized 2-isopropenylnaphthalene in an amount of at least 10 mole %.

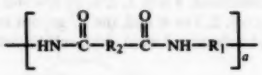
4,504,632

AMIDE ETHER IMIDE BLOCK COPOLYMERS

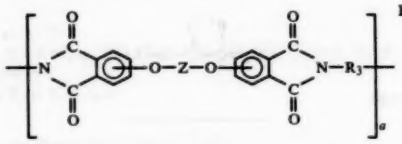
Fred Holub, Schenectady, N.Y., and Daniel E. Floryan, Pittsfield, Mass., assignors to General Electric Company, Pittsfield, Mass.

Filed Dec. 30, 1983, Ser. No. 567,334
Int. Cl.³ C08G *73/14*
U.S. Cl. 525—432 **12 Claims**

1. An amide ether imide block copolymer wherein the block copolymer consists essentially of polymeric units of the formulas:

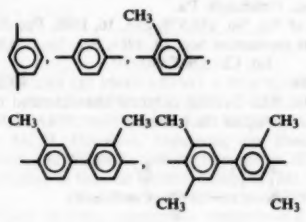


I.

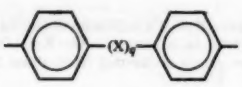


II.

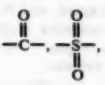
where "a" represents a whole number in excess of 1, and Z is a member of the class consisting of (1)



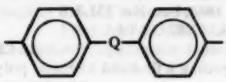
and (2) divalent organic radicals of the general formula:



where X is a member selected from the class consisting of divalent radicals of the formulas: $-C_yH_{2y}-$,



—O— and —S— where q is 0 or 1, y is a whole number from 1 to 5, the divalent bonds of the —O—Z—O— radical are situated on the phthalic anhydride-derived units, in the 3,3'-, 3,4'-,4,3'-or the 4,4'-positions, and R_1, R_2 and R_3 are divalent organic radicals independently selected from the class consisting of (a) aromatic hydrocarbon radicals having from 6 to about 20 carbon atoms and halogenated derivatives thereof, (b) alkylene radicals and cycloalkylene radicals having from 2 to about 20 carbon atoms, $C_{(2-8)}$ alkylene terminated polydiorganosiloxane, and (c) divalent radicals included by the formula:



where Q is a member selected from the class consisting of: —O—,

—S—, and $-C_xH_{2x}-$, and x is a whole number from 1 to 5 inclusive.

4,504,633

MODIFIED POLY(OXAZOLIDONE/URETHANE) COMPOSITIONS

Anthony L. DiSalvo, Greenwich, Conn., and Chung-Chieh Tsai, South Salem, N.Y., assignors to Stauffer Chemical Company, Westport, Conn.

Filed Jun. 1, 1983, Ser. No. 499,956
The portion of the term of this patent subsequent to May 31, 2000, has been disclaimed.
Int. Cl.³ C08F *283/10*; C08L *63/10*
U.S. Cl. 525—438 **15 Claims**

1. An isocyanate-reactive prepolymer containing at least one terminal epoxide group with an associated secondary hydroxy group, said prepolymer being modified by having grafted thereto a polymeric moiety derived from polymerizing an ethylenically unsaturated monomer.

4,504,634

COPOLYESTER-CARBONATE BLENDS EXHIBITING IMPROVED PROCESSABILITY

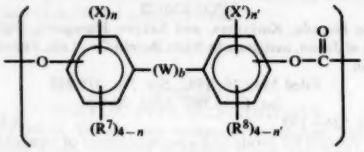
Kenneth F. Miller, Mt. Vernon, and Edward Belfoure, New Harmony, both of Ind., assignors to General Electric Company, Mt. Vernon, Ind.

Filed Dec. 27, 1982, Ser. No. 452,907
Int. Cl.³ C08L *67/02, 69/00*
U.S. Cl. 525—439 **13 Claims**

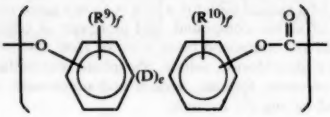
1. Copolyester-carbonate blends exhibiting improved processability consisting essentially of, in physical admixture:

(i) at least one high molecular weight aromatic copolyester-carbonate resin containing carbonate bonds and ester bonds wherein said ester bonds are present in from about 25 to about 90 mole percent derived from (a) a carbonate precursor, (b) at least one dihydric phenol, and (c) at least one difunctional carboxylic acid or a reactive derivative thereof; and

(ii) an amount effective to improve the processability of said blends but insufficient to significantly deleteriously affect the heat distortion temperature thereof, said amount being from about 2 to about 60 weight percent, based on the total amount of copolyester-carbonate resin and halogenated polycarbonate resin present, of at least one halogenated high molecular weight aromatic polycarbonate resin containing from about 10 to about 80 weight percent of at least one repeating structural unit represented by the general formula

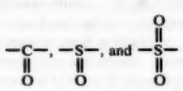


and from about 20 to about 90 weight percent of at least one repeating structural unit represented by the general formula



wherein

W is selected from alkylene, cycloalkylene, alkylidene, cycloalkylidene, —S—, —S—S—, —O—,



radicals

each R^7 is independently selected from hydrogen and monovalent hydrocarbon radicals,

each R^8 is independently selected from hydrogen and monovalent hydrocarbon radicals,

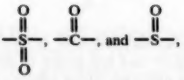
each X is independently selected from halogen radicals,

each X' is independently selected from halogen radicals,

b is either zero or one,

n and n' are independently selected from whole numbers having a value of from 0 to 4 inclusive, with the proviso that the sum of n+n' is equal to from 2–8,

D is selected from divalent hydrocarbon radicals, —S—, —S—S—, —O—,



each R^9 is independently selected from monovalent hydrocarbon radicals and monovalent hydrocarbonoxy radicals,

each R^{10} is independently selected from monovalent hydrocarbon radicals and monovalent hydrocarbonoxy radicals,

e is either zero or one, and

f and f' are independently selected from whole numbers having a value of from 0 to 4 inclusive.

4,504,635

PROCESS FOR THE PREPARATION OF POLYMERIC COMPOSITIONS

Robert J. Weber, Jr., Belle Mead, and Donald F. Smith, Jr., Bridgewater, both of N.J., assignors to Union Carbide Corporation, Danbury, Conn.

Continuation-in-part of Ser. No. 438,497, Nov. 2, 1982, abandoned. This application Oct. 26, 1983, Ser. No. 545,684

Int. Cl.³ C08G 63/76

U.S. Cl. 525—450 **26 Claims**

1. A process for preparing a polymeric composition comprising polymerizing one or more ethylenically unsaturated monomers with a composition comprising:

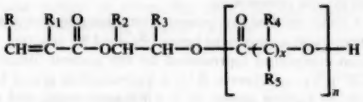
(a) 0 to 10 weight percent of a lactone;

(b) greater than 0 weight percent to about 20 weight percent of hydroxyalkyl acrylate or methacrylate;

(c) 2 or less weight percent of diacrylates;

(d) 10 or less weight percent of products resulting from Michael addition, acrylic polymerization, transesterification reactions, or other side reactions;

(e) remainder to 100 weight percent of a reactive monomer of the following formula:



wherein R, R_1, R_2, and R_3 are independently hydrogen or methyl, R_4 and R_5 are independently hydrogen or alkyl of from 1 to 12 carbon atoms, x is from 4 to 7, and both n and the average value of n in the composition are equal to or greater than 1; and

(f) less than about 100 parts per million of catalyst.

4,504,636

PROCESS FOR PREPARATION OF FORMALDEHYDE COPOLYMERS

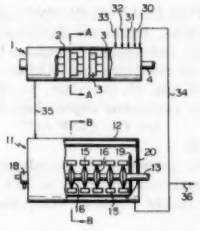
Kazumasa Tsunemi; Taro Suzuki, and Yoshiichi Yamamoto, all of Ube, Japan, assignors to Ube Industries, Ltd., Yamaguchi, Japan

Filed Dec. 8, 1983, Ser. No. 559,199

Claims priority, application Japan, Dec. 21, 1982, 57-222972

Int. Cl.³ C08G 85/00, 4/00

U.S. Cl. 526—67 **18 Claims**



1. A process for the preparation of formaldehyde copolymers, which comprises continuously feeding formaldehyde, a cyclic formal and 0.1 to 20 parts by weight, per 100 parts by weight of formaldehyde, of an inert organic solvent to a biaxial mixer where the formaldehyde is copolymerized with the cyclic formal in the presence of boron trifluoride or an ether complex thereof.

17. A process according to claim 1, wherein the copolymerizatin of formaldehyde is carried out by using an arrangement comprising the biaxial mixer and a cooler, while the copolymer produced is continuously circulated from the biaxial mixer to the cooler and a part of the copolymer cooled in the cooler and withdrawn therefrom is continuously circulated into the biaxial mixer.

4,504,637

OLEFIN POLYMERIZATION CATALYSTS AND PROCESS FOR PRODUCING OLEFIN POLYMERS BY USING SUCH CATALYSTS

Akinobu Shiga; Toshio Sasaki, and Junpei Kojima, all of Ichihars, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Dec. 13, 1983, Ser. No. 560,850

Claims priority, application Japan, Dec. 16, 1982, 57-221661; Dec. 16, 1982, 57-221662

Int. Cl.³ C08F 4/44, 210/00

U.S. Cl. 526—119 18 Claims

10. A process for producing olefin polymers by using a catalyst system comprising:

(A) a solid catalyst component containing hydrocarbyloxy groups said component being obtained by reacting a titanium compound represented by the general formula $Ti(OR^1)_nX_{3-n}$ (wherein R^1 is a hydrocarbon group having 1 to 20 carbon atoms, X is a halogen atom, and n is a number defined by $0<n\leqq 3$) with an ether compound and titanium tetrachloride in a slurry state in the presence of magnesium halide, and

(B) an organoaluminum compound.

4,504,638

ETHYLENE POLYMERS MADE FROM PHOSPHATE SUPPORTED CHROMIUM CATALYST

Max P. McDaniel, and Marvin M. Johnson, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 423,596, Sep. 27, 1982, Pat. No. 4,429,086, which is a division of Ser. No. 221,877, Dec. 31, 1980, Pat. No. 4,364,842. This application Nov. 7, 1983, Ser. No. 549,511

Int. Cl.³ C08F 4/44, 4/24, 4/62, 110/02

U.S. Cl. 526—134 12 Claims

1. A polymer made of a monomer composition consisting essentially of ethylene having a ratio of HLMI/MI to M_w/M_n of greater than 15 and a melt index within the range of 0.1 to 0.5 produced using a catalyst system comprising a chromium catalyst on an aluminum phosphate-containing support in conjunction with a trialkylborane cocatalyst, said trialkylborane having alkyl groups having 2 to 5 carbon atoms per group.

4,504,639

PROCESS FOR POLYMERIZING 1,3-BUTADIENE

Haruo Ueno, Chiba; Hidetomo Ashitaka, Ichihara; Kazuya Jinda, Kisarazu, and Kouichi Nakajima, Chiba, all of Japan, assignors to Ube Industries, Ltd., Chiba, Japan

Filed Aug. 19, 1982, Ser. No. 409,607

Claims priority, application Japan, Aug. 27, 1981, 56-133249

Int. Cl.³ C08F 4/72

U.S. Cl. 526—146 26 Claims

1. A process for preparing polybutadiene with an enhanced mechanical strength containing 5% to 30% by weight of boiling n-hexane-insoluble fraction, comprising the successive steps of:

(A) polymerizing 1,3-butadiene in the presence of a catalyst prepared from a soluble cobalt compound and an organic aluminum halide in a polymerization medium to obtain cis-1,4-polybutadiene; and

(B) polymerizing 1,3-butadiene in the polymerization system, in the presence of a 1,2-polymerization catalyst consisting essentially of a soluble cobalt compound, an organic aluminum halide, an organic lithium compound, and carbon disulfide, phenyl isothiocyanate or mixture thereof wherein the soluble cobalt compound is used in an amount of 0.0005 to 0.1 mol%, the organic aluminum halide is used in an amount of 0.01 to 1 mol%, the organic lithium compound is used in an amount of 0.01 to 1 mol%, and the carbon disulfide or phenyl isothiocyanate is used in an amount of 0.001 to 1 mol%, based on the 1,3-butadiene to be polymerized.

4,504,640

PROCESS FOR PRODUCING MONOALLYLAMINE POLYMER

Susumu Harada, Koriyama, and Sakuro Hasegawa, Fujisawa, both of Japan, assignors to Nitto Boseki Co., Ltd., Fukushima, Japan

Filed May 19, 1982, Ser. No. 379,983

Int. Cl.³ C08F 4/04, 26/02

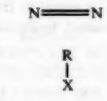
U.S. Cl. 526—193 4 Claims

1. A process for producing a homopolymer of an acid salt of monoallylamine which comprises polymerizing an inorganic acid salt of monoallylamine in a polar solvent selected from the group consisting of water, inorganic acids, aqueous solutions of inorganic acids, aqueous solutions of metallic salts of inorganic acids, organic acids, aqueous solutions of organic acids, alcohols, dimethylsulfoxide and dimethylformamide in the presence of a radical initiator which is an inorganic or organic acid salt of an azo compound, said inorganic or organic acid salt of said azo compound being selected from the group consisting of hydrochloride, sulfate, phosphate, alkylsulfate, paratoluene sulfonate, formate, acetate and propionate, said azo compound having the formula:

$$R_1—N{=}N—R_2$$

wherein at least one of R_1 and R_2 is a group containing a nitrogen atom cationizable in a polymerization medium and which is selected from the group consisting of aminoalkyl, aminoaryl, amidinylalkyl, aminoalkaryl, aminoaralkyl, amidinylalkaryl, cyanoaminoalkyl and cyanoaminoalkaryl.

4. A process for producing homopolymers of acid salts of monoallylamine which comprises polymerizing an inorganic acid salt of monoallylamine in a polar solvent selected from the group consisting of water, inorganic acids, aqueous solutions of inorganic acids, aqueous solutions of metallic salts of inorganic acids, organic acids, aqueous solutions of organic acids, alcohols, dimethylsulfoxide and dimethylformamide in the presence of a radical initiator which is an inorganic or organic acid salt or an azo compound, said inorganic or organic acid salt of said azo compound being selected from the group consisting of hydrochloride, sulfate, phosphate, alkylsulfate, paratoluene sulfonate, formate, acetate and propionate, said azo compound having the formula



where R is alkylene, alkylalkylene or arylalkylene linked to said nitrogen atoms of said azo group to form a ring; and X is a group containing nitrogen atoms cationizable in a polymerization medium and which is selected from the group consisting of aminoalkyl, aminoaryl, amidinylalkyl, amidinylaryl, aminoalkaryl, aminoaralkyl, amidinylalkaryl, cyanoaminoalkyl and cyanoaminoalkaryl.

4,504,641

POLYACRYLAMIDE CROSS-LINKED WITH A POLYSACCHARIDE RESIN AS ELECTROPHORETIC GEL MEDIUM

Samuel Nochumson, Rockland, Me., assignor to FMC Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 350,446, Feb. 19, 1982, abandoned. This application Oct. 17, 1983, Ser. No. 542,795

Int. Cl.³ C08L 5/02; C08B 37/12

U.S. Cl. 526—238.2 6 Claims

1. An electrophoretic gel composition comprising polyacrylamide cross-linked with a polysaccharide resin having a weight average molecular weight of from about 5000 to about 10^6 daltons and wherein there has been substituted for at least some of the hydroxyl hydrogens in said resin an ethylenically

unsaturated group of from 2 to 12 carbon atoms capable of cross-linking with acrylamide in the presence of a catalyst to form said cross-linked polyacrylamide.

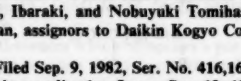
4,504,642

ACRYLIC TYPE SELF-ADHESIVE

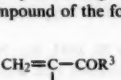
Akira Ohmori, Ibaraki, and Nobuyuki Tomihashi, Takatsuki, both of Japan, assignors to Daikin Kogyo Co., Ltd., Osaka, Japan

Filed Sep. 9, 1982, Ser. No. 416,161
Claims priority, application Japan, Sep. 10, 1981, 56-143342
Int. Cl.³ C08F *214/18*
U.S. Cl. 526—246 **5 Claims**

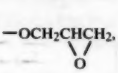
1. An acrylic type self-adhesive which comprises a polymer comprising units of (a) at least about 30% by mole of at least one compound of the formula:



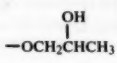
wherein R^1 is a hydrogen atom or a methyl, ethyl or propyl group, l is an integer of 1 to 5, s is 0 or 1, and Rf is $-(CF_2)_mX$ or $-(CF_2)_pO(CF_2)nF$ (wherein m is an integer of 1 to 10, X is a hydrogen or fluorine atom or a hexafluoroisopropyl group, n is an integer of 1 to 5 and p is an integer of 1 to 3), and optionally (b) at least one compound of the formula:



wherein R^2 is a hydrogen atom or a methyl, ethyl or propyl group and R^3 is —OH, $-NH_2$, $-NHCH_2OH$,



$-OCH_2CH_2OH$,



or $-OCH_2CH_2N(CH_3)_2$, said polymer having an intrinsic viscosity of 0.1 to 1.0 measured at 35° C. in methylethylketone or hexafluoro-m-xylene, a fluorine content of at least 20% by weight, and a glass transition point of −5° C. or lower.

4,504,643

(METH)ACRYLIC ACID/METHALLYLSULFONATE COPOLYMERS

Jean Boutin, Mions, and Jean Neel, Lyon, both of France, assignors to Rhone-Poulenc Industries, Paris, France

Continuation of Ser. No. 267,754, May 28, 1981, abandoned. This application Mar. 11, 1983, Ser. No. 474,562
Claims priority, application France, Jun. 9, 1980, 80 12741
Int. Cl.³ C08F *228/02*
U.S. Cl. 526—287 **3 Claims**

1. A water-soluble addition copolymer, comprising (i) both recurring acrylic acid and recurring methacrylic acid units and (ii) a minor amount of recurring alkali metal methallylsulfonate units, the amount by weight of said recurring methallylsulfonate units (ii) in said copolymer ranging from 10 to 18% of the total amount of said recurring acrylic acid and recurring methacrylic acid units (i) therein.

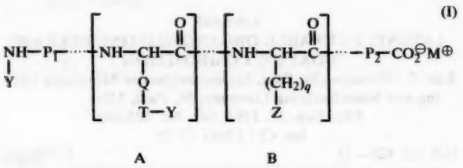
4,504,644

PROTEIN DERIVATIVE CONTAINING GRAFTED ULTRAVIOLET-ABSORBING RADICALS, THE PROCESS FOR ITS PREPARATION AND COMPOSITION IN WHICH IT IS PRESENT

Gérard Lang, Saint Gratien, and Alain Malaval, Marly la Ville, both of France, assignors to L'Oreal, Paris, France

Filed Aug. 16, 1983, Ser. No. 523,771
Claims priority, application France, Aug. 23, 1982, 82 14480; Jun. 28, 1983, 83 10654; Jun. 28, 1983, 83 10655
Int. Cl.³ C07G *7/00*; A61K *7/42*
U.S. Cl. 527—201 **27 Claims**

1. A chemically modified protein derivative which has a molecular weight of about 500 to 50,000 and which corresponds to the following general formula:



(I)

A B

in which formula:

Y is a radical of a molecule—capable of absorbing ultraviolet radiation;

P_1 and P_2 are independently chain protein units which are not acylated or chemically modified by nucleophilic addition or substitution; $N^+(R_2)_4$, in M^+ represents H^+, a cation derived from an alkali metal or from half an atom of magnesium, or $N^+(R_2)_4$, in which formula the radicals R_2 are identical or different and represent a hydrogen atom or an alkyl or hydroxyalkyl radical having at most 4 carbon atoms;

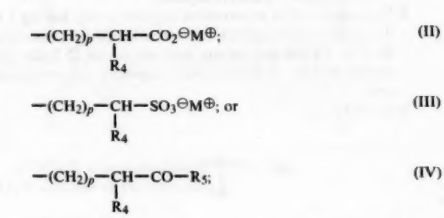
each Q is independently an alkyl, aryl or aralkyl radical of a constituent aminoacid of the protein;

T represents O, NH or, if the protein contains one or more cysteine units, S;

Z is:

(i) a radical $SO_3—M^+$, the cation M^+ being as defined; or

(ii) SR_3, in which formula R_3 represents:

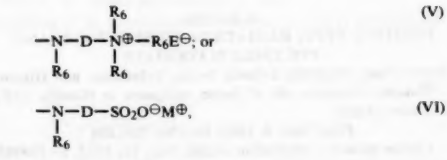


(II)

(III)

(IV)

in which formulae p is 0 or an integer from 1 to 5, R_4 is a hydrogen atom or an alkyl radical having at most 4 carbon atoms and R_5 represents:



(V)

(VI)

in which formulae D is a linear or branched alkylene group containing a total of from 2 to 10 carbon atoms, the cation $M^{\oplus}$ is as defined above, the radicals R_6 being iden-

tical or different and representing a hydrogen atom or an alkyl or hydroxyalkyl radical having at most 4 carbon atoms, and $E^{\ominus}$ being a halide ion or $RCOO^{\ominus}$, $RSO_3^{\ominus}$ or $RSO_4^{\ominus}$, R representing a hydrocarbon rest containing from 1 to 10 carbon atoms; or alternatively

(iii) an amino radical originating from a basic aminoacid of the protein, monosubstituted or disubstituted by a radical R_3;

q is an integer from 1 to 5, with the proviso that, if Z represents a radical $SO_3^{\ominus}M^{\oplus}$ or SR_3, q is necessarily equal to 1 and the protein contains cystine units;

the units A represent from 1 to 70% by weight of the protein derivative; and

the units B represent from 0 to 15% by weight of the protein derivative.

4,504,645

LATENTLY-CURABLE ORGANOSILICONE RELEASE COATING COMPOSITION

Kurt C. Melancon, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Sep. 23, 1983, Ser. No. 535,040

Int. Cl.³ C08G *77/06*

U.S. Cl. 528—15 **19 Claims**

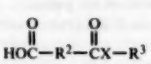
1. A latently-curable organosilicone composition comprising the following components:

(a) an ethylenically-unsaturated polysiloxane,

(b) a polyhydrosiloxane,

(c) an amount of a platinum- or other metal-containing hydrosilation catalyst sufficient to facilitate the reaction of components (a) and (b), and

(d) an amount of an organic hydrosilation inhibitor sufficient to inhibit premature gelation of the mixture of components (a), (b), and (c) at low, ambient or room temperature but insufficient in amount to prevent hydrosilation of the mixture at an elevated temperature, said organic hydrosilation inhibitor having the structural formula



III

wherein

R^2 is ethynylene or cis-ethenylene;

R^3 is a saturated or unsaturated organic group having 1 to 12 carbon atoms which is unsubstituted or substituted by 1 to 23 halogen atoms, and has up to 25 hydrogen atoms, and 0 to 5 non-peroxidic catenary oxygen atoms; and

X is —O— or

in which R^4 is the same as defined for R^3, and R^3 and R^4 together can form an alkylene group which with the N can form a 5- or 6-atom membered saturated azacyclic ring.

4,504,646

POSITIVE TYPE, RADIATION-SENSITIVE ORGANIC POLYMER MATERIALS

Kazuo Nate, Machida; Takashi Inoue, Yokohama, and Hitoshi Yokono, Fujisawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

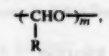
Filed Nov. 9, 1983, Ser. No. 550,200

Claims priority, application Japan, Nov. 15, 1982, 57-198958

Int. Cl.³ C08G *77/06*

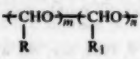
U.S. Cl. 528—16 **4 Claims**

1. A positive type, radiation-sensitive polymer which comprises an aliphatic aldehyde polymer having at least one Si atom in its molecular chain, represented by the general formula (1) or (2):



(1)

or



(2)

wherein R is an alkyl group having 1 to 8 carbon atoms, a halogenated alkyl group, an aralkyl group or a halogenated aralkyl group, each of the groups contains at least one Si atom in its molecular chain at the β-position, and R_1 is an alkyl group having 1 to 8 carbon atoms, a halogenated alkyl group, an aralkyl group or a halogenated aralkyl group and m/n is 0.45/0.55.

4,504,647

COMPOUNDS HAVING ONE OR MORE ALDIMINE AND OXAZOLIDINE GROUPS, PROCESS FOR THEIR PREPARATION AND THEIR USE AS CURING AGENTS FOR POLYISOCYANATES

Lutz D. Zabel, Ruggenstrasse 26, Birmensdorf, Switzerland (8903); Jürg Widmer, Limmattalstr. 3, Zürich, Switzerland (8049), and Ueli Sulser, Hönggerstrasse 12, Oberengstringen, Switzerland (8102)

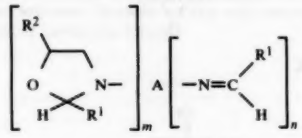
Filed May 20, 1981, Ser. No. 265,286

Claims priority, application Fed. Rep. of Germany, May 21, 1980, 3019356

Int. Cl.³ C07D *263/04*; C08G *18/32*

U.S. Cl. 528—68 **5 Claims**

1. A compound having one aldimine group and one oxazolidine group in its molecule, of the formula I:



(I)

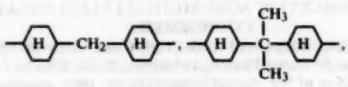
wherein

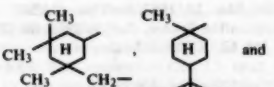
m and n are integers and are each 1,

R^1 is an isopropyl radical,

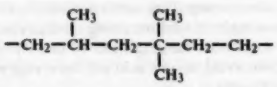
R^2 is a hydrogen atom, an alkyl radical having 1 to 3 carbon atoms, or cresyloxymethyl radical, and

A is a bivalent organic radical selected from the group consisting of $—CH_2—CH_2—$, $—CH_2—CH_2—CH_2—$, $—(CH_2)_6—$,





and

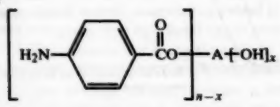


4,504,648
POLYURETHANEUREA AND PROCESS FOR PREPARING THE SAME

Kozo Otani, Hyogo; Yoshio Yamada, and Hiroyuki Okumura, both of Osaka, all of Japan, assignors to Toyo Tire & Rubber Company, Limited, Osaka, Japan

Filed Nov. 7, 1983, Ser. No. 549,452
Claims priority, application Japan, Nov. 13, 1982, 57-199384
Int. Cl.[3] C08G 18/32, 18/22, 18/14
U.S. Cl. 528—76 4 Claims

1. A polyurethaneurea which comprises a polymer obtained by a polyaddition reaction of (a) a polyetherpolyol derivative and (b) an at least 2-valent polyisocyanate, the polyetherpolyol derivative having at least, on average, one terminal amino group in which at least, on average, one hydroxyl group is substituted by a residue of para-aminobenzoic acid ester, and having the general formula



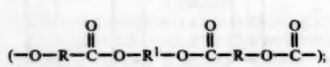
wherein n is an integer of 2 to 8, x is an average value and a positive number of 0.05n to (n−1), A is an n-valent radical obtained by removal of hydroxyl groups from an n-valent polyoxyalkylenepolyol having a molecular weight of 400 to 10,000.

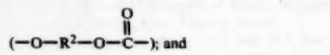
4,504,649
COPOLYESTER-CARBONATE RESINS

Victor Mark, Evansville, Ind., assignor to General Electric Company, Mt. Vernon, Ind.

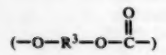
Filed Dec. 16, 1983, Ser. No. 562,273
Int. Cl.[3] G08G 63/64
U.S. Cl. 528—176 32 Claims

1. Thermoplastic copolyester-carbonates exhibiting improved processability comprised of recurring structural units represented by the general formulae





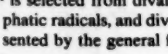
and



wherein:

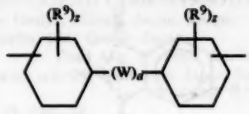
R is independently selected from divalent aromatic radicals;

R^1 is selected from divalent aromatic radicals, divalent aliphatic radicals, and divalent aliphatic ether residues represented by the general formula



wherein R^5 is independently selected from alkylene radicals and cycloalkylene radicals, R^6 is selected from alkylene radicals and cycloalkylene radicals, and n is a positive integer having a value of from 1 to about 10;

R^2 is selected from divalent residues of dihydric phenols represented by the general formula



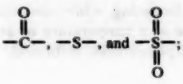
wherein

R^9 is independently selected from monovalent hydrocarbon radicals and halogen radicals,

z is independently selected from positive integers having a value of from 0 to 4 inclusive,

d is either zero or one, and

W is selected from divalent hydrocarbon radicals, —O—, —S—, —S—S—,



and

R^3 is selected from divalent aliphatic radicals.

4,504,650
COPOLYETHERIMIDES AND PROCESS OF PREPARATION

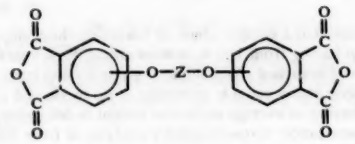
Stephen M. Cooper, Pittsfield, Mass., assignor to General Electric Company, Pittsfield, Mass.

Filed Dec. 5, 1983, Ser. No. 558,176
Int. Cl.[3] C08G 73/10
U.S. Cl. 528—185 17 Claims

1. A method for preparing a copolyetherimide, comprising

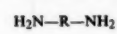
(a) providing a reaction mixture comprising

(1) a dianhydride of the formula



in which Z is a divalent arylene, with

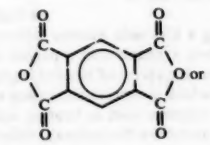
(2) a diamine of the formula



in which R is a divalent organic radical selected from the group consisting of hydrocarbon radicals;

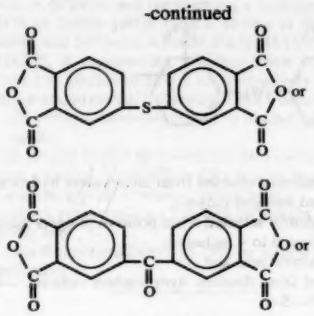
(b) heating the reaction mixture to a temperature of at least 100° C. to initiate polymerization; and

(c) adding to the reaction mixture a dianhydride of the formula



(i)

-continued



(ii)

(iii)

(iv) a mixture of any of the foregoing, while continuing to heat the reaction mixture at a temperature of at least 100° C., whereby said polyetherimide is formed.

4,504,651

SULFUR-CONTAINING POLYESTER AND PROCESS FOR ITS PRODUCTION

Toyohiko Yamaguchi; Koichi Kashima; Minoru Ozutsumi, and Masaru Morinaga, all of Tokyo, Japan, assignors to Hodogaya Chemical Co., Ltd. and Katsura Sangyo Co., Ltd., both of Tokyo, Japan

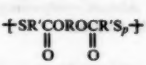
Filed Nov. 22, 1983, Ser. No. 554,248

Claims priority, application Japan, Dec. 3, 1982, 57-211392; Mar. 10, 1983, 58-38192

Int. Cl.³ C08G *75/26*

U.S. Cl. 528—360 **13 Claims**

1. A sulfur-containing polymer, consisting essentially of: repeating units of the formula:



(I)

wherein R is a straight chain or branched chain alkylene group having from 1 to 6 carbons atoms, R′ is a straight chain or branched chain alkylene group having from 1 to 3 carbon atoms and p is an integer of up to 10, said polymer having an average molecular weight as determined by gel permeation chromatography analysis of from 500 to 10,000 and a sulfur content of from 15 to 65% by weight.

4,504,652

POLYESTER PLASTICIZER

Charles R. Widder, Marysville, and Don S. Wozniak, Powell, both of Ohio, assignors to Sherex Chemical Company, Inc., Dublin, Ohio

Continuation-in-part of Ser. No. 526,598, Aug. 26, 1983, abandoned. This application Apr. 25, 1984, Ser. No. 603,591

Int. Cl.³ C08G *63/70*

U.S. Cl. 528—480 **19 Claims**

1. A method for improving a low acid number polyester plasticizer of the type made from a dibasic acid, a polyol, and a chain terminator wherein a molar excess of alcohol ingredients is used, the improvement which comprises subjecting said polyester to a second stage reaction with a treating agent reactive with hydroxyl groups to reduce the hydroxyl value to no more than about 4.

4,504,653

PROCESS FOR PRODUCING POLYOLEFIN RESIN PARTICLES

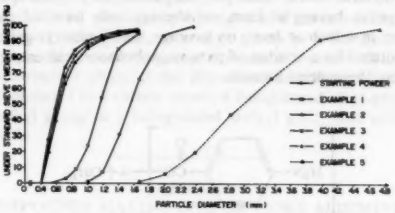
Hideki Kuwabara, Hatano; Shohei Yoshimura, Tomioka; Toru Yamaguchi, Hiratsuka, and Yoshimi Sudo, Fujisawa, all of Japan, assignors to Japan Styrene Paper Corporation, Tokyo, Japan

Filed May 25, 1983, Ser. No. 498,874

Claims priority, application Japan, May 26, 1982, 57-89393

Int. Cl.³ C08F *45/28, 45/46*

U.S. Cl. 528—491 **15 Claims**



1. A process for producing particles having an increased particle diameter from a powder of a polyolefin resin, which comprises heating the polyolefin resin powder at a temperature higher than the melting point of the resin in a dispersion medium in the presence of an inorganic dispersing agent and a surface-active agent.

4,504,654

POLYMER RECOVERY

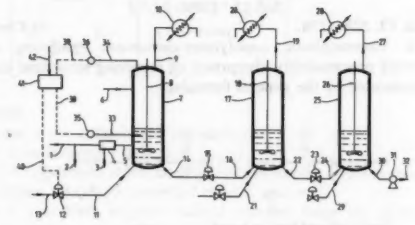
John P. Duffy, Sarnia, Canada, assignor to Polysar Limited, Sarnia, Canada

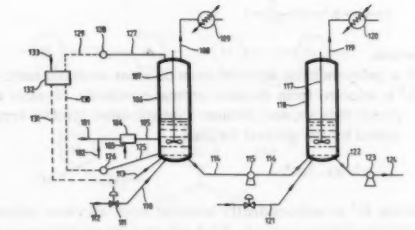
Filed Sep. 16, 1982, Ser. No. 418,629

Claims priority, application Canada, Nov. 26, 1981, 390978

Int. Cl.³ C08F *6/10*

U.S. Cl. 528—499 **6 Claims**





1. An improved continuous process for the recovery of an elastomeric polymer from a solution thereof in organic solvent, which process comprises contacting in a coagulation vessel

operated at a pressure greater than atmospheric the solution of the polymer with water and steam to produce a first overhead stream of vaporized solvent and water and a first bottom stream of water and polymer particles containing residual solvent, passing said first overhead stream to a condensing means for condensing said vaporized solvent and water to the liquid phase, passing said first bottom stream to at least one but not more than three stripping vessels in series, said stripping vessels being maintained at a lower pressure than in said coagulation vessel but above atmospheric pressure, to produce a second overhead stream of vaporized solvent and water and a second bottom stream of polymer particles in water, passing said second overhead stream of vaporized solvent and water to a condensing means for condensing said vaporized solvent and water to the liquid phase, passing said second bottom stream of polymer particles in water to separating means and separating said polymer particles from the water and drying said separated polymer particles, the improvement being that the temperature and pressure in said coagulation vessel are inter-relatedly varied such that the first overhead vapor stream from said coagulation vessel contains not more than about 50 mole percent of said organic solvent and that the polymer particles in water of the first bottom stream contain a predetermined amount of residual solvent which is greater than about 3 but not greater than about 8 percent by weight based on polymer plus solvent, in accordance with the equation

$$T = C_1(P) + C_2(X) + C_3$$

where

T is the temperature in °C. in the coagulation vessel,

P is the absolute pressure in kg/cm^2 in the coagulation vessel, and

X is the weight percent of solvent remaining in the polymer particles of the first bottom stream,

and C_1, C_2 and C_3 are empirical constants for the process, said coagulation vessel being operated at a temperature of from about 105° to about 125° C. and a pressure of from about 2.1 to about 3 5 kg/cm^2 absolute.

4,504,655

SUBSTANCES POTENTIATING THE ACTIVITY OF ANTIBIOTICS AND THEIR PRODUCTION

Akira Imada, Hyogo; Kazuhiko Kintaka, and Susumu Shinagawa, both of Osaka, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

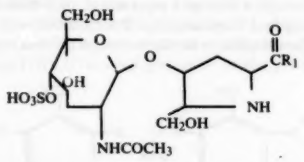
Continuation-in-part of Ser. No. 448,917, Dec. 9, 1982, abandoned. This application Feb. 3, 1983, Ser. No. 463,542

Claims priority, application Japan, Jul. 7, 1981, 56-106554; Feb. 15, 1982, 57-23099; Dec. 24, 1982, 57-232055

Int. Cl.[3] **C08B** *37/00;* **A01N** *31/00;* **A61K** *31/71*

U.S. Cl. 536—18.7 **2 Claims**

2. A substantially pure compound of the formula:



wherein R_1 is $NHCH_2CH_2SO_3H$ or OH, or a pharmaceutically acceptable salt thereof.

4,504,656

ESTERIFIED CARBOXYMETHYL CELLULOSES

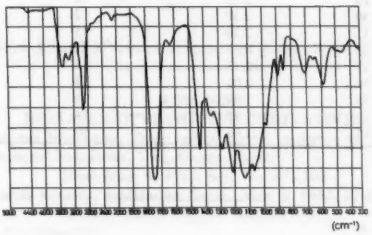
Takeo Omiya, Himeji, Japan, assignor to Daicel Chemical Industries, Ltd., Osaka, Japan

Filed Aug. 30, 1983, Ser. No. 527,748

Claims priority, application Japan, Sep. 1, 1982, 57-152947

Int. Cl.[3] **C08B** *13/00*

U.S. Cl. 536—66 **10 Claims**



1. An esterified carboxymethyl cellulose which is soluble in an organic solvent, wherein the degree of substitution by carboxymethyl group per anhydroglucose unit is 2.00 or more, the ester group is a hydrocarbon residue having 1 to 8 carbon atoms, the degree of substitution by the esterified carboxymethyl group per anhydroglucose unit is 1.50 or more, the remaining unsubstituted carboxymethyl groups are in the form of the free acid, and the degree of polymerization is 20 to 700.

4,504,657

CEPHADROXIL MONOHYDRATE

Daniel Bouzard, Franconville; Abraham Weber, and Jacques Stemer, both of Paris, all of France, assignors to Bristol-Myers Company, New York, N.Y.

Continuation of Ser. No. 931,800, Aug. 7, 1978, abandoned, which is a continuation of Ser. No. 874,457, Feb. 2, 1978, Pat. No. 4,160,863, which is a division of Ser. No. 785,392, Apr. 7, 1977, abandoned. This application Mar. 16, 1982, Ser. No. 358,567

Claims priority, application United Kingdom, Apr. 7, 1977, 17028/76

Int. Cl.[3] **C07D** *501/22, 501/12*

U.S. Cl. 544—30 **1 Claim**

1. Crystalline 7-[D-α-amino-α-(p-hydroxyphenyl-)acetamido]-3-methyl-3-cephem-4-carboxylic acid monohydrate exhibiting essentially the following x-ray diffraction properties:

Line	Spacing d(A)	Relative Intensity
1	8.84	100
2	7.88	40
3	7.27	42
4	6.89	15
5	6.08	70
6	5.56	5
7	5.35	63
8	4.98	38
9	4.73	26
10	4.43	18
11	4.10	61
12	3.95	5
13	3.79	70
14	3.66	5
15	3.55	12
16	3.45	74
17	3.30	11
18	3.18	14
19	3.09	16
20	3.03	29
21	2.93	8
22	2.85	26

-continued

Line	Spacing d(A)	Relative Intensity
23	2.76	19
24	2.67	9
25	2.59	28
26	2.51	12
27	2.46	13
28	2.41	2
29	2.35	12
30	2.30	2
31	2.20	15
32	2.17	11
33	2.12	7
34	2.05	4
35	1.99	4
36	1.95	14
37	1.90	10

4,504,658

EPIMERIZATION OF MALONIC ACID ESTERS

Masayuki Narisada, Osaka; Hiroshi Onoue; Mitsuaki Ohtani, both of Nara, and Fumihiko Watanabe, Osaka, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

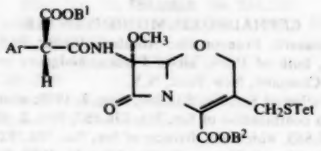
Filed Jun. 14, 1983, Ser. No. 504,287

Claims priority, application Japan, Jul. 2, 1982, 57/116048

Int. Cl.³ C07D *498/04*

U.S. Cl. 544—90 **7 Claims**

1. A process for preparing a compound of the formula

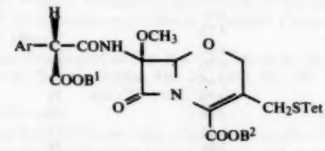


wherein Ar represents mono- or dicyclic aryl in which the cyclic groups are 5 or 6 membered or a heterocyclic group selected from pyrrolyl, furyl, thienyl, pyrazolyl, imidazolyl, oxazolyl, thiazolyl, isothiazolyl, oxadiazolyl, thiadiazolyl, tetrazolyl, triazolyl, oxatriazolyl, thiatriazolyl, pyridyl, pyrimidyl, pyrazinyl, pyridazinyl, triazinyl or indolyl, said aryl and heterocyclic groups being unsubstituted or substituted by halogen, hydroxy, C_1 to C_3 alkyl, alkoxy or alkanoyloxy,

tet is tetrazolyl which is unsubstituted or substituted by C_1 to C_4 alkyl or C_1 to C_4 alkyl substituted by carboxy, esterified carboxy, cyano or dimethylamino,

B^1 and B^2 independently represent a carboxy protecting group capable of being introduced into or removed from the molecule under conditions which do not have an adverse effect on the other portions of the molecule,

which comprises subjecting a compound of the formula



to epimerization with a base selected from the group consisting of alkali metal hydrogen carbonate, tri-lower alkylamine, diethanolamine, triethanolamine, pyridine, picoline, lutidine or collidine and subsequently precipitating the product.

4,504,659

1-OXADETHIACEPHAM COMPOUNDS

Mitsuru Yoshioka; Uyeo Shoichiro, both of Toyonaka; Yoshio Hamashima, Kyoto; Ikuo Kikkawa, Takarazuka; Teruji Tsuji, Takatsuki, and Wataru Nagata, Nishinomiya, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

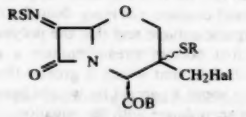
Division of Ser. No. 374,862, May 4, 1982, Pat. No. 4,443,598, which is a continuation-in-part of Ser. No. 322,662, Nov. 18, 1981, Pat. No. 4,366,316, which is a continuation of Ser. No. 72,600, Sep. 5, 1979, abandoned, which is a continuation of Ser. No. 877,811, Feb. 14, 1978, abandoned. This application Oct. 19, 1983, Ser. No. 543,939

Claims priority, application Japan, Feb. 15, 1977, 52-15813; Jun. 6, 1977, 52-67025; Oct. 1, 1980, 55-138092

Int. Cl.³ C07D *498/04*

U.S. Cl. 544—92 **3 Claims**

1. A 7-(arylthio or alkylthio)imino-3-(arylthio or alkylthio)-3-halomethyl-1-dethia-1-oxacepham-4α-carboxylic acid compound of the following formula



wherein

R is C_1 to C_3 alkyl or monocyclic aryl,

COB is carboxy or protected carboxy, and

Hal is a halogen.

4,504,660

PROCESS FOR THE PRODUCTION OF 2,6-DIAMINOBENZONITRILE DERIVATIVES

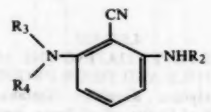
Dieter H. Klaubert, Perkiomenville, and Stanley C. Bell, Narberth, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed Jul. 6, 1982, Ser. No. 395,520

Int. Cl.³ C07C *121/52*; C07D *207/04*

U.S. Cl. 544—163 **1 Claim**

1. A process for production of a compound of the formula:



wherein

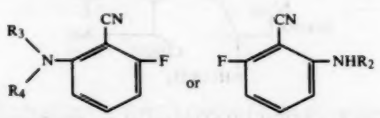
R_2 is hydrogen or methyl and

R_3 and R_4 are, independently, hydrogen, alkyl of 1 to 6 carbon atoms, aralkyl of 7 to 12 carbon atoms, cycloalkyl of 5 to 8 carbon atoms or aryl of 6 to 12 carbon atoms,

or

R_3 and R_4, taken with the nitrogen atom to which they are attached represent 1-pyrrolidinyl, 1-piperidinyl, 1-piperazinyl, 4-methyl-1-piperazinyl, or 4-morpholinyl,

which comprises displacing the fluoro substituent from a 2-amino-6-fluorobenzonitrile derivative of the formulae:



with an amine of the formulae:

H_2NR_2 or NHR_3R_4, respectively, by reaction at a temperature of about 75° C. to about 200° C.

4,504,661

POLYTRIAZINYLAMINES, PROCESS FOR THEIR PREPARATION

Hartmut Wiezer, Gersthofen, and Gerhard Pfahler, Augsburg, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

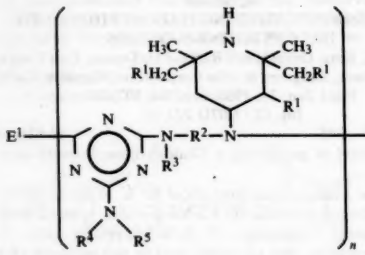
Filed Jun. 12, 1981, Ser. No. 273,057

Claims priority, application Fed. Rep. of Germany, Jun. 19, 1980, 3022896

Int. Cl.³ C07D *401/12, 401/14*

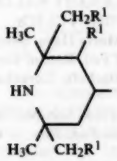
U.S. Cl. 544—198 **6 Claims**

1. A compound of the formula:



(I)

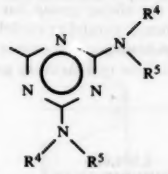
in which n is greater than 1 but not greater than 200, the polymer chain having an "atactic" structure; R^1 is hydrogen or C_1- to C_5-alkyl; R^2 represents C_2- to C_{18}-alkylene or C_2- to C_{12}-bis-(propoxy)-alkylene or C_6- to C_{18}-mono-, di- or tri-cycloalkylene, in which in the first case, two C atoms can be replaced by N atoms which can carry propylene groups, or represents C_6- to C_{18}-arylene or C_7- to C_{18}-aralkylene; R^3 is hydrogen or C_1- to C_{18}-alkyl or C_5- to C_{12}-cycloalkyl or C_7- to C_{14}-aralkyl; R^4 and R^5 are identical or different and represent hydrogen, C_1- to C_{18}-alkyl, C_5- to C_{12}-cycloalkyl, C_7- to C_{14}-aralkyl or a group of the formula (III)



(III)

in which R^1 has the meaning given above, and R^5 additionally has the meaning of C_1- to C_{18}-alkoxypropyl or C_2- to C_4-hydroxyalkyl or C_2- to C_5-dimethylaminoalkyl or -diethylaminoalkyl, or, when $n>1$, R^5 represents a group of the formula $—R^2NHPip$ in the case where $R^4=R^3$, or a group of the formula $—R^2NHR^3$ in the case where $R^4=Pip$, R^2, R^3 and R^4 having the meanings given above and Pip being a group of the formula (III); E^1 is a halogen atom or the group

and E^2 is hydrogen or a triazine ring of the formula (IV)



(IV)

in which R^4 and R^5 have the meanings given above.

4,504,662

ISOXAZOLOPYRIMIDINE DERIVATIVES

Yoshiyasu Furukawa, Takarazuka, Japan, assignor to Takeda Chemical Industries, Ltd., Osaka, Japan

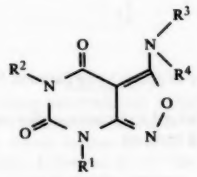
Filed Mar. 4, 1983, Ser. No. 472,105

Claims priority, application Japan, Mar. 8, 1982, 57-36807

Int. Cl.³ C07D *487/04;* A61K *31/505*

U.S. Cl. 544—255 **8 Claims**

1. A compound of the formula



wherein

R^1 and R^2 are methyl;

R^3 is alkylcarbonyl in which the alkyl moiety is straight-chain, branched or cyclic alkyl having 1 to 10 carbon atoms, phenylcarbonyl which may be substituted by hydroxyl, C_{1-4}alkyl or C_{1-4}alkoxyl, or 5- or 6-membered heterocycle-carbonyl selected from thiophenecarbonyl, furancarbonyl and pyridinecarbonyl; and

R^4 is hydrogen, alkylcarbonyl in which the alkyl moiety is straight-chain, branched or cyclic alkyl having 1 to 10 carbon atoms, phenylcarbonyl which may be substituted by hydroxyl, C_{1-4}alkyl or C_{1-4}alkoxyl, or 5- or 6-membered heterocycle-carbonyl selected from thiophenecarbonyl, furancarbonyl and pyridinecarbonyl.

4,504,663

3-HYDROXYALKYL-3,4-DIHYDRO-1-SUBSTITUTED ISOQUINOLINES

Gérard H. Moinet, Orsay; Philippe L. Dostert, Paris, and Guy R. Boargery, Colombes, all of France, assignors to Delalande S.A., Courbevoie, France

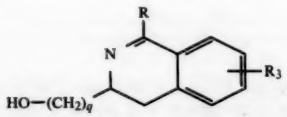
Division of Ser. No. 473,182, Mar. 8, 1983, Pat. No. 4,431,851, which is a division of Ser. No. 331,484, Dec. 16, 1981, Pat. No. 4,386,090. This application Nov. 15, 1983, Ser. No. 552,181

Claims priority, application France, Dec. 22, 1980, 80 27252; Dec. 14, 1981, 81 23304

Int. Cl.³ C07D *217/16, 401/04*

U.S. Cl. 546—144 **2 Claims**

1. A compound having the formula



wherein q is 2 or 3; R is phenyl, halophenyl, nitrophenyl,

alkylphenyl in which the alkyl group has 1 to 4 carbon atoms, alkoxyphenyl in which the alkoxy group has 1 to 4 carbon atoms, trifluoromethylphenyl, pyridyl or cyclohexyl; and R_3 is halogen, hydrogen, alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms or two methoxy groups.

4,504,664

2-PIPERIDONES

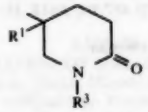
Richard V. Nelson, Wilmington, Del., and John F. Stephen, West Chester, Pa., assignors to ICI Americas Inc., Wilmington, Del.

Filed May 20, 1983, Ser. No. 496,680

Int. Cl.³ C07D *211/40, 211/42*

U.S. Cl. 546—243 **2 Claims**

1. A pyridone of the following formula (IV):



(IV)

wherein

R^1 is alkanoyloxy of about 1 to 4 carbons, hydroxy or halogen and

R^3 is alkoxy of about 1 to 6 carbons, alkanoyloxy of about 1 to 6 carbons or hydroxy.

4,504,665

PROCESS FOR PRODUCING CHLORONICOTINIC ACID COMPOUNDS

Takahiro Haga, Kusatsu; Tohru Koyanagi, Kyoto; Toshio Nakajima, Moriyama, and Takeshi Ohshima, Kusatsu, all of Japan, assignors to Ishihara Sangyo Kaisha Ltd., Osaka, Japan

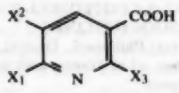
Filed Apr. 6, 1983, Ser. No. 482,535

Claims priority, application Japan, Apr. 12, 1982, 57-60688; Sep. 8, 1982, 57-156335

Int. Cl.³ C07D *213/55*

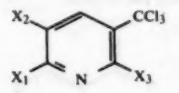
U.S. Cl. 546—318 **6 Claims**

1. A process for producing a chloronicotinic acid compound represented by the general formula



(I)

where each of X_1, X_2 and X_3 is a hydrogen atom or a chlorine atom and at least one of X_1 and X_3 is a chlorine atom, which comprises hydrolyzing at a temperature of 80°–130° C. a trichloromethyl pyridine compound represented by the general formula



(II)

where X_1, X_2 and X_3 are as defined above, in the presence of sulfuric acid or phosphoric acid having a concentration of from 40 to 100%, said acid being present in an amount of from 2–30 mols per mol of the trichloromethyl pyridine compound.

4,504,666

HIGH YIELD PREPARATION OF AROMATIC AMINE OXIDES

Gary W. Earl, Bexley, and Howard M. Hickman, Worthington, both of Ohio, assignors to Sherex Chemical Company, Inc., Dublin, Ohio

Filed Jun. 4, 1982, Ser. No. 385,000

Claims priority, application Japan, Jul. 3, 1981, 56-103210; Aug. 18, 1981, 56-93011; Oct. 24, 1981, 56-169427

Int. Cl.³ C07D *213/61, 251/00, 239/02, 241/46*

U.S. Cl. 546—345 **23 Claims**

1. In a process for oxidizing an aromatic amine to form an aromatic amine oxide, the improvement characterized by:

forming a reaction mixture comprising said aromatic amine and a peracid comprising an organic peracid, an inorganic peracid, or mixtures thereof, and maintaining said reaction mixture under non-aqueous conditions at a temperature and for a time adequate until substantially all of said aromatic amine is formed into said aromatic amine oxide.

4,504,667

PROCESS FOR OXIDIZING HALOPYRIDINES TO HALOPYRIDINE-N-OXIDES

Lawrence E. Katz, Orange, and Richard H. Dumas, East Haven, both of Conn., assignors to Olin Corporation, Cheshire, Conn.

Filed Jun. 24, 1983, Ser. No. 507,410

Int. Cl.³ C07D *213/61*

U.S. Cl. 546—345 **11 Claims**

1. A method of producing a 2-halopyridine-N-oxide comprising

reacting at a temperature from about 20° C. to about 120° C. (a) hydrogen peroxide, (b) a 2-halopyridine selected from the group consisting of 2-chloropyridine and 2-bromopyridine, and (c) acetic acid in the presence of a catalyst selected from the group consisting of maleic acid, maleic anhydride, phthalic anhydride, and mixtures thereof, in order to produce the corresponding 2-halopyridine-N-oxide; said reaction carried out by employing from about 0.5 to about 5.0 moles of H_2O_2 per mole of 2-halopyridine; employing from about 0.5 to about 2.0 moles of acetic acid per mole of 2-halopyridine, and employing from about 0.1 to about 0.8 moles of catalyst per mole of 2-halopyridine.

4,504,668

PROCESS FOR THE PREPARATION OF N-SULFOALKYL QUATERNARY SALTS OF NITROGEN HETEROCYCLICS

Helmut Kampfer, Cologne; Marie Hase, Bergisch Gladbach, and Max Glass, Cologne, all of Fed. Rep. of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

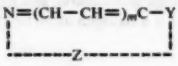
Filed Mar. 11, 1981, Ser. No. 242,605

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1980, 3010427

Int. Cl.³ C07D *293/12, 277/62, 263/54, 735/04*

U.S. Cl. 548—120 **9 Claims**

1. In a process for the preparation of sulfoalkyl quaternary salts of tertiary amines by reacting a tertiary amine corresponding to the formula



in which

Y represents hydrogen, halogen, a saturated or unsaturated aliphatic group having up to 6 carbon atoms, an alkoxy or alkylthio group, or mercapto;

Z represents the atoms required to complete a heterocyclic

group comprising at least one 5-membered or 6-membered heterocyclic ring; and

m is 0 or 1;

with a sulfoalkylating agent at a temperature of from 100° to 250° C., the improvement which comprises reacting said tertiary amine with the sulfoalkylating agent which is a dimer that is obtained by heating a hydroxy alkane sulfonic acid of propane or butane or the corresponding alkane sultone having 5 or 6 ring members to a temperature in the region of from 80° to 180° C. in the presence of water in an amount of from 1 to 4 moles per mole of hydroxy alkane sulfonic acid or alkane sultone.

4,504,669

1,2-BENZISOXAZOLOXYETHYLAMINES AND INTERMEDIATES FOR THE PREPARATION THEREOF

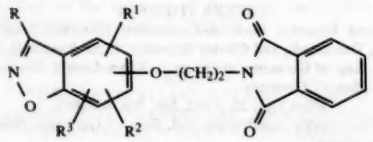
Gregory M. Shutske, Nauheim, Fed. Rep. of Germany, assignor to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.

Continuation of Ser. No. 238,276, Feb. 25, 1981, Pat. No. 4,427,691. This application Oct. 14, 1983, Ser. No. 541,837

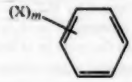
Int. Cl.[3] **C07D** *261/20*

U.S. Cl. 548—241 **4 Claims**

1. A compound of the formula



wherein R is



wherein X is hydrogen, halogen, loweralkyl, loweralkoxy, loweralkylthio or trifluoromethyl; R^1, R^2 and R^3 are each independently hydrogen, halogen or methyl; and m is 1, 2 or 3.

4,504,670

PROCESS FOR THE CONTINUOUS MANUFACTURE OF TRIOXANE

Hartmut Voigt, Frankfurt am Main; Karl-Friedrich Mück, Wiesbaden; Helmut Bär, Offenbach am Main; Herbert Mader, Nauheim; Karlheinz Burg, and Günter Sextro, both of Wiesbaden, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

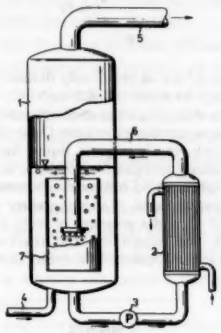
Continuation of Ser. No. 135,168, Mar. 27, 1978, abandoned. This application Oct. 6, 1983, Ser. No. 539,624

Claims priority, application Fed. Rep. of Germany, Mar. 30, 1979, 2912767

Int. Cl.[3] **C07D** *323/06, 321/06, 319/06, 317/12, 321/12, 321/00*

U.S. Cl. 549—347 **3 Claims**

1. A process for the continuous manufacture of trioxan, optionally together with cyclic formals, from aqueous formaldehyde solutions containing optionally at least one diol and/or at least one epoxide, in the presence of acidic catalysts, in a circulation reactor with evaporator, at a residence time in the range of from 15 to 240 minutes, wherein the vapor/liquid mixture leaving the evaporator is fed in below the liquid level



of the reaction mixture in the reactor, and the vaporous product current is let off from the reactor.

4,504,671

METHOD FOR PREPARING ALDOXIME OR KETOXIME-O-ALKANOIC ACID

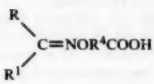
Dennis K. Krass, Canal Fulton; John C. Crano, Akron, and Melvin S. Newman, Columbus, all of Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Oct. 15, 1982, Ser. No. 434,448

Int. Cl.[3] **C07C** *131/00, 131/02, 131/04, 131/06, 131/08, 131/10*

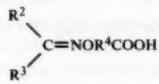
U.S. Cl. 560—21 **14 Claims**

1. A process for preparing aldoxime or ketoxime-O-alkanoic acid of the formula:



wherein R and R^1 are the same or different and represent hydrogen or an organic radical and R^4 is linear or branched C_1 to C_4 alkylene, by reacting an aldehyde or ketone of the formula:

with an aldoxime or ketoxime-O-alkanoic acid of the formula:



wherein R, R^1 and R^4 are as previously defined and R^2 and R^3 are the same or different and represent hydrogen or an organic radical, with the proviso that R^2 and R^3 are not respectively identical with R and R^1, in a liquid organic reaction medium containing a strong organic or mineral acid at a temperature above the boiling point of the by-product aldehyde or ketone of the formula:

wherein R^2 and R^3 are as previously defined and at a pressure of from about 0.1 to about 0.6 atmosphere.

8. A process for preparing 5-(2-chloro-4-trifluoromethylphenoxy)-2-nitroacetophenoneoxime-O-(acetic acid, methyl ester) by reacting, in an organic liquid medium and in the presence of a strong inorganic or organic acid, 5-(2-chloro-4-trifluoromethylphenoxy)-2-nitroa :etophenone with isopropylidene aminooxyacetic acid, at a temperature of from about 50° C. to about 120° C. and a pressure of from about 0.1 to about 0.6 atmosphere and esterifying the reaction product with methyl alcohol in the presence of a strong inorganic or organic acid.

4,504,672

CATALYTIC PROCESS FOR THE CONVERSION OF TOLUENE TO EQUIMOLAR AMOUNTS OF PHENYL ACETATE AND METHYLENE DIACETATE

James E. Lyons, Wallingford; George Suld, Springfield, and Robert W. Shinn, Aston, all of Pa., assignors to Suntech, Inc., Philadelphia, Pa.

Division of Ser. No. 957,273, Nov. 3, 1978, Pat. No. 4,260,808, which is a continuation-in-part of Ser. No. 945,747, Sep. 25, 1978, abandoned. This application Nov. 5, 1980, Ser. No. 204,104

Int. Cl.³ C07C *67/00*

U.S. Cl. 560—131 **26 Claims**

1. In the process for the oxidation of p-cresylacetate with air or oxygen in the liquid phase under elevated pressures and temperatures in the presence of a strong acid catalyst and acetic anhydride to form hydroquinone diacetate, the improvement wherein the reaction is carried out in a closed system whereby no reaction effluent is removed, thereby forming methylene diacetate in approximately equimolar amounts with the said hydroquinone acetate, together with minor amounts of acetic acid, and wherein both the hydroquinone diacetate and methylene diacetate are recovered.

14. In the process for the oxidation of m-cresyl acetate with air or oxygen in the liquid phase under elevated pressures and temperatures in the presence of a strong acid catalyst and acetic anhydride to form resorcinol diacetate, the improvement wherein the reaction is carried out in a closed system whereby no reaction effluent is removed, thereby forming methylene diacetate in approximately equimolar amounts with the said resorcinol diacetate, together with minor amounts of acetic acid.

4,504,673

PREPARATION OF TARTRONIC ESTERS

Kurt Findeisen, Odenthal, and Rudolf Fauss, Cologne, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

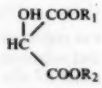
Filed Apr. 11, 1984, Ser. No. 599,038

Claims priority, application Fed. Rep. of Germany, May 4, 1983, 3316264

Int. Cl.³ C07C *69/675*

U.S. Cl. 560—180 **8 Claims**

1. A process for the preparation of a tartronic ester of the formula



in which R_1 and R_2 each independently in an optionally substituted alkyl or cycloalkyl radical, comprising reacting (trimethylsilyloxy)tricyanomethane in the presence of a mineral acid, with at least one alcohol of the formula R_1OH and R_2OH and hydrolyzing the product of reaction.

4,504,674

PROCESS FOR DIMERIZING ACRYLATES TO HEXENEDIOATES

Ronald J. McKinney, Wilmington, Del., assignor to E. I. DuPont de Nemours & Co., Wilmington, Del.

Continuation-in-part of Ser. No. 348,364, Feb. 12, 1982, abandoned. This application Apr. 18, 1983, Ser. No. 485,943

Int. Cl.³ C07C *67/343*

U.S. Cl. 560—202 **13 Claims**

1. A ruthenium-catalyzed process for making dialkyl hexenedioates in the absence of a hydrogen donor consisting essentially of dimerizing an alkyl acrylate of the formula $H_2C{=}CH{-}COOR$, wherein R is C_1 to C_8 alkyl, in the presence of an alcohol acting as catalyst promoter, said alcohol present at a concentration of no more than 100 mols per gram atom of ruthenium, and a ruthenium compound treated with one or more metals selected from the group consisting of zinc, manganese, iron, cobalt, and copper, said ruthenium compound being in an oxidation state greater than zero, there being present optionally a phosphine and optionally a carboxamide cosolvent.

4,504,675

METHOD FOR MAKING ISOBUTYRIC ACID OR ESTERS THEREOF

Siegmund Besecke, Seeheim-Jugenheim; Hermann-Josef Siegert, Darmstadt, and Günter Schröder, Ober-Ramstadt, all of Fed. Rep. of Germany, assignors to Röhm GmbH, Darmstadt, Fed. Rep. of Germany

Filed Oct. 25, 1982, Ser. No. 436,467

Claims priority, application Fed. Rep. of Germany, Nov. 14, 1981, 3145311

Int. Cl.³ C07C *51/14, 67/38*

U.S. Cl. 560—233 **10 Claims**

1. In a process for the continuous production of isobutyric acid or an alkyl ester thereof by the Koch synthesis, by reacting propylene, carbon monoxide, and water or an alkanol in the presence of hydrogen fluoride in at least one reaction space containing a liquid phase and a gas phase under high pressure, the improvement which comprises releasing said pressure at least partially whereby a gas containing organic compounds from said synthesis evolves from said liquid phase, adding oxygen to said evolved gas and at least partially combusting the organic compounds contained therein, then contacting the evolved gas containing the at least partially combusted organic compounds with at least a portion of the water or alkanol to be reacted with said propylene and carbon monoxide, whereby at least a portion of said combusted organic compounds are absorbed by said water or alkanol, returning said water or alkanol containing the absorbed combusted organic compounds to said reaction space, and discharging any unabsorbed gas from the reaction system.

4,504,676

PREPARATION OF DIACYLOXYBUTENES

Rolf Schnabel, Schifferstadt; Gerd Kissau, Muenster; Hans-Martin Weitz, Bad Durkheim, and Rolf Fischer, Heidelberg, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Mar. 9, 1984, Ser. No. 588,120

Claims priority, application Fed. Rep. of Germany, Mar. 15, 1983, 3309168

Int. Cl.³ C07C *67/055*

U.S. Cl. 560—244 **9 Claims**

1. In a process for the preparation of a 1,4-diacyloxybutene by reacting a 1,3-butadiene with a carboxylic acid and oxygen in the presence of a catalyst containing palladium or platinum

in a reactor at a temperature of 80°–120° C. and under a pressure of 1–100 bar, the improvement which comprises:

fractionally distilling the reaction mixture to separate off the 3,4-diacyloxybutene which is formed as a by-product in the reaction; and

recycling to the reactor some or all of this 3,4-diacyloxybutene by-product.

4,504,677

PROCESS FOR PRODUCING METHACRYLIC ACID

Teruhisa Sakamoto, Shin-nanyo, and Shigeo Nakamura, Yamaguchi, both of Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Shin-nanyo, Japan

Filed Jul. 14, 1978, Ser. No. 924,572

Claims priority, application Japan, Jul. 22, 1977, 52-87246

Int. Cl.³ C07C *51/25, 57/055*

U.S. Cl. 562—534 **11 Claims**

1. A process for producing methacrylic acid by the vapor phase catalytic oxidation of methacrolein with molecular oxygen or a molecular oxygen-containing gas, which comprises: conducting said reaction over a catalyst of a multi-element complex oxide having the formula

$$Mo_aP_bAs_cCu_dCr_eX_fO_g$$

wherein X represents at least one element selected from the group consisting of Ce, Nd, W and Fe; and a, b, c, d, e, f and g represent atomic ratios wherein a=12, b=0.5 to 3.0, c=0.01 to 1.2, d=0.01 to 2.0, e=0.05 to 2.0 and f=0 to 1.0 and g varies depending on the valences of the other components of the catalyst within the range of 37 to 58.

4,504,678

PURE CRYSTALLINE RACEMIC SODIUM PARAHYDROXYMANDELATE, PROCESS FOR ITS PREPARATION AND USES THEREOF

Alain Schouteeten, Ezanville, and Yani Christidis, Paris, both of France, assignors to Societe Francaise Hoechst, Puteaux, France

Division of Ser. No. 284,835, Jul. 20, 1981,. This application Jan. 3, 1983, Ser. No. 455,143

Int. Cl.³ C07C *59/50*

U.S. Cl. 562—470 **4 Claims**

1. Pure crystalline racemic sodium parahydroxymandelate free from any ions of chloride, acetate, formate and sulfate group.

4,504,679

PROCESS FOR SYNTHESIZING UREA

Shigeru Inoue, Kamakura; Hiroshi Ono, Fujisawa; Akito Fukui, Inba; Hidetsugu Fujii, Mobara; Haruyuki Morikawa, Funabashi, and Suguru Watanabe, Chiba, all of Japan, assignors to Toyo Engineering Corporation, Tokyo, Japan

Filed Sep. 30, 1982, Ser. No. 430,557

Claims priority, application Japan, Oct. 16, 1981, 56-164150

Int. Cl.³ C07C *126/02*

U.S. Cl. 564—67 **5 Claims**

1. In a process for synthesizing urea, including the steps of:

(a) in a urea synthesis zone, reacting ammonia and carbon dioxide, at a pressure of 160–190 kg/cm²G and a temperature of 170°–195° C., while maintaining the molar ratio of the total ammonia to the total carbon dioxide in said urea synthesis zone in the range of 3.5–5.0, whereby to obtain a urea synthesis melt containing urea, ammonium carbamate and excess ammonia;

(b) subjecting said urea synthesis melt to a stripping operation using carbon dioxide as a stripping gas, the amount of carbon dioxide supplied as a stripping gas being at least 60 % of the make-up amount of carbon dioxide that is needed to make up for the carbon dioxide consumed in the process, the stripping operation being carried out at the same pressure as the pressure in said urea synthesis zone and at a temperature of 170°–205° C. whereby to decompose ammonium carbamate in said melt, separating a first gas containing carbon dioxide and ammonia from said melt and thereby obtaining a first urea synthesis effluent containing ammonia and carbon dioxide;

(c) subjecting said first urea synthesis effluent to a medium-pressure decomposition at a pressure of 12–25 kg/cm²G, separating a second gas comprising a part of the ammonia and carbon dioxide that was contained in said first effluent and recovering a second urea synthesis effluent in which the sum of the amounts of ammonia and carbon dioxide contained therein is from 5–12% by weight;

(d) subjecting said second urea synthesis effluent to low temperature decomposition to separate a third gas containing ammonia and carbon dioxide and to obtain a first aqueous urea solution substantially free of ammonia and carbon dioxide;

(e) subjecting said first aqueous urea solution to concentration and finishing steps;

(f) absorbing said third gas containing ammonia and carbon dioxide that was separated in step (d) in water, a dilute aqueous solution of ammonium carbonate or a second aqueous urea solution, whereby to obtain a first aqueous absorption liquid, and then absorbing said second gas containing ammonia and carbon dioxide that was separated in step (c) in said first aqueous absorption liquid, at the same pressure as the pressure in step (c), whereby to obtain a second aqueous absorption liquid;

(g) contacting said second aqueous absorption liquid with said first gas that was separated in step (b) at the same pressure as the pressure in said urea synthesis zone, condensing at least part of the ammonia and carbon dioxide contained in said first gas in order to maintain the temperature in said urea synthesis zone in the range of 170°–195° C., removing the resulting heat of condensation and using at least some of said heat of condensation to effect the decomposition in step (c), and obtaining a mixture of said second aqueous absorption liquid, condensate and uncondensed ammonia and carbon dioxide; and

(h) recirculating said mixture to said urea synthesis zone in step (a); the improvement which comprises:

in step (b), prior to said stripping operation, said urea synthesis melt is first subjected to rectification in order to reduce the ammonia concentration of said melt and thereby adjust the ratio of NH_3 to CO_2 of said melt before said melt is subjected to said stripping step, and, in step (d), the low temperature decomposition is effected by reducing the pressure of said second urea synthesis effluent to 1–5 kg/cm²G and thereby transforming said second effluent to a mixed stream of a third aqueous urea solution and a fourth gas containing ammonia and carbon dioxide which fourth gas is separated from said second effluent by the reduction in pressure, then subjecting said mixed stream to adiabatic stripping using carbon dioxide as a stripping gas, the amount of carbon dioxide used in said adiabatic stripping being from 1–10% of the said make-up amount of carbon dioxide, thereby separating said third gas containing ammonia and carbon dioxide and obtaining said first aqueous urea solution substantially free of ammonia and carbon dioxide.

4,504,680

4-PHENYL-1,3-BENZODIAZEPINES

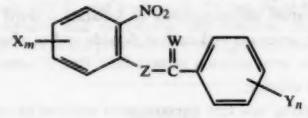
Lawrence L. Martin, Lebanon, N.J.; Manfred Worm, Wiesbaden-Naurod, Fed. Rep. of Germany, and Charles A. Crichlow, Piscataway, N.J., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.

Division of Ser. No. 300,022, Sep. 8, 1981, abandoned, which is a division of Ser. No. 91,062, Nov. 11, 1979, Pat. No. 4,309,424, which is a continuation-in-part of Ser. No. 948,896, Oct. 5, 1978, abandoned. This application Oct. 12, 1983, Ser. No. 541,363

Int. Cl.³ C07C *131/00*

U.S. Cl. 564—265 **5 Claims**

1. A compound of the formula



in which Z is methylene; W is a group of the formula —NOR_5 wherein R_5 is hydrogen; X and Y are the same or different and each can be hydrogen, chlorine, bromine, fluorine, methoxy, alkyl of from 1 to 3 carbon atoms, hydroxy or trifluoromethyl with the proviso that when X is hydrogen, Y is not hydrogen or methyl and when Y is hydrogen, X is not methyl; and m is the integer 1 or 2; n is the integer 1, 2 or 3.

4,504,681

CATALYTIC OXIDATION OF PRIMARY AMINES TO OXIMES BY ELEMENTAL OXYGEN

John N. Armor, Hanover Township, Morris County, N.J., assignor to Allied Corporation, Morris Township, Morris County, N.J.

Filed Dec. 20, 1982, Ser. No. 451,702

Int. Cl.³ C07C *131/04, 131/00*

U.S. Cl. 564—267 **13 Claims**

1. A process for the production of oximes which comprises contacting, in the vapor phase, a primary saturated aliphatic or alicyclic amine of 2 to 12 carbon atoms with an elemental oxygen gas in the presence of an effective amount of a catalyst comprising an oxygen-containing tungsten substance on a metal oxide support or alumina at a contact time of the heated gaseous reactants with the catalyst of between about 0.05 and 5 minutes.

4,504,682

NOVEL POLYOXAALKYL AMINOALCOHOLS

Louis Linguenheld, Ruelisheim, and Gerard Soula, Meyzieu, both of France, assignors to Rhone-Poulenc Industries, Paris, France

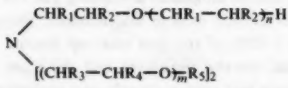
Division of Ser. No. 296,214, Aug. 25, 1981, Pat. No. 4,429,160. This application Jan. 5, 1983, Ser. No. 455,898

Claims priority, application France, Aug. 27, 1980, 80 18561

Int. Cl.³ C07C *85/06*

U.S. Cl. 564—480 **6 Claims**

1. A process for the preparation of a polyoxaalkyl aminoalcohol having the structural formula:



wherein R_1, R_2, R_3 and R_4, which may be identical or different, are each a hydrogen atom or an alkyl radical having from 1 to 4 carbon atoms; R_5 is an alkyl, or phenyl substituted alkyl radical having from 1 to 12 carbon atoms, a cycloalkyl radical having from 3 to 12 carbon atoms, a phenyl, or alkyl substituted phenyl radical with said alkyl substituent having from 1 to 12 carbon atoms; n is an integer ranging from 1 to 9; and m is an integer ranging from 1 to 10; comprising reacting a polyalkylene glycol having the structural formula:

$$HO—CHR_1—CHR_2—O\text{-}\{CHR_1—CHR_2—O\}_{\overline{n}}H$$

with a bis(polyoxaalkyl)amine having the structural formula:

$$HN\text{-}\{(CHR_3—CHR_4—O)_{\overline{m}}R_5\}_2$$

in a molar ratio of polyalkylene glycol to bis(polyoxaalkyl)amine at least 1.5 times in excess of the stoichiometric amount, at a temperature ranging from about 120° to 220° C., and in the presence of a catalytically effective amount of a hydrogenation/dehydrogenation catalyst.

4,504,683

PHOSPHOLES WITH FUNCTIONAL SUBSTITUENTS ON THE PHOSPHORUS AND PROCESS FOR THE PREPARATION OF PHOSPHOLES

Anne Breque, Mennecy; Georges Muller, Boutigny s/Essonne; Hubert Bonnard, Bretigny s/Orge; Francois Mathey, and Philippe Savignac, both of Paris, all of France, assignors to Institut National de Recherche Chimique Appliquee (IRCHA) and Centre National de la Recherche Scientifique, both of, France

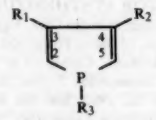
Filed May 20, 1981, Ser. No. 265,312

Claims priority, application France, May 28, 1980, 80 11818

Int. Cl.³ C07F *9/50*

U.S. Cl. 568—12 **10 Claims**

1. Process for preparing phospholes and P-functional phospholes corresponding to the general formula:



in which:

R_1 and R_2 are identical or different and represent hydrogen or a lower alkyl group of C_1 to C_4, and

R_3 represents an aryl group; or a lower alkyl-substituted aryl group; or an alkyl group of C_1–C_{12}; or a —$(CH_2)_nZ$ group where Z is a monovalent function of —COO-alkyl, —CN, —CO-aryl, —CO-alkyl or —OH and $n \geq 1$, which process comprises:

reacting at least one alkyl- or arylhalogeno phosphine with a butadiene whose carbons in at least one of the 2 and 3 positions carry possibly a lower alkyl substituent, then subjecting the resultant cyclic adduct to the action of a tertiary amine having a pKa between 5 and 11, and then optionally functionalizing the resultant product by splitting the P-alkyl or the P-aryl bond and by reacting a metal halide to obtain an organo metallic derivative,

and then reacting the latter with a compound $X—(CH_2)_nZ$ to provide the corresponding P-functional product.

4,504,684

METAL COORDINATION POLYMERS AS HYDROFORMYLATION AND HYDROGENATION CATALYSTS

Joseph R. Fox, Solon, and Frederick A. Pesa, Aurora, both of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Continuation of Ser. No. 337,559, Jan. 6, 1982, abandoned. This application Aug. 4, 1983, Ser. No. 520,084

Int. Cl.³ C07C *45/50*

U.S. Cl. 568—454 **4 Claims**

1. A hydroformylation process for converting an olefin to the corresponding aldehyde by a reaction wherein said olefin with hydrogen and carbon monoxide is contacted with a catalyst comprising a polymeric transition metal complex to form said aldehyde, the improvement wherein said olefin is in the vapor phase when contacted with said catalyst, said aldehyde is in the vapor phase when withdrawn from said catalyst and said catalyst comprises (a) a solid, inorganic catalyst support material and (b) a solid, active catalytic material comprising a polymeric transition metal complex capable of catalyzing said reaction.

4,504,685

OXYALKYLATION PROCESS

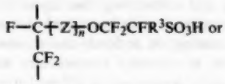
Ronald J. Vaughan, Orinda, Calif., assignor to Varen Technology, Marshallton, Del.

Continuation-in-part of Ser. No. 065,613, Aug. 9, 1979, abandoned, which is a continuation of Ser. No. 904,502, May 10, 1978, abandoned. This application Aug. 19, 1980, Ser. No. 179,520

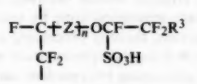
Int. Cl.³ C07C *41/03*

U.S. Cl. 568—678 **8 Claims**

1. In the process for the oxyalkylation of a hydroxylic compound by contacting it with an alkylene oxide, the improvement comprising contacting said hydroxylic compound and said alkylene oxide in the presence of a perfluorocarbon polymer containing pendant sulfonic acid groups wherein said hydroxylic compound is water, an aliphatic alcohol, an aromatic alcohol, an oxyalkylated aliphatic alcohol, or an oxyalkylated aromatic alcohol, and said perfluorocarbon polymer contains the repeating structure



or



4,504,686

PROCESS FOR PREPARING 1,1,2-TRIFLUORO-2-CHLOROETHYL DIFLUOROMETHYL ETHER

Shuichi Takamatsu, Kawanishi, Japan, assignor to Daikin Kogyo Co., Ltd., Osaka, Japan

Continuation of Ser. No. 408,231, Aug. 16, 1982, abandoned. This application Aug. 1, 1984, Ser. No. 636,786

Int. Cl.³ C07C *41/22*

U.S. Cl. 568—684 **4 Claims**

1. A process for preparing 1,1,2-trifluoro-2-chloroethyl difluoromethyl ether which comprises reacting 1,1,2-trifluoro-2-chloroethyl dichloromethyl ether with hydrogen fluoride in a gaseous phase in the absence of a catalyst or in the presence of a catalyst selected from the group consisting of oxyfluorides of molybdenum, fluorides and oxyfluorides of chromium, thallium and aluminum.

4,504,687

METHOD FOR ETHERIFICATIONS

Edward M. Jones, Jr., Friendswood, Tex., assignor to Chemical Research & Licensing Company, South Houston, Tex.

Continuation of Ser. No. 349,043, Feb. 16, 1982, abandoned. This application Sep. 7, 1983, Ser. No. 529,926

Int. Cl.³ C07C *41/05*

U.S. Cl. 568—697 **13 Claims**

1. A method for producing C_1 or C_2 alkyl tertiary C_4 ether comprising:

(a) feeding:

(1) a C_4 hydrocarbon stream containing isobutene, and

(2) an alcohol selected from methanol or ethanol, to a first zone of a distillation column reactor having two separated zones independently operated at different pressures, said first zone containing a fixed bed acidic cation exchange resin,

(b) concurrently:

(1) contacting said C_4 hydrocarbon stream and said alcohol with said fixed bed acidic cation exchange resin packing in said first zone at a pressure in the range of 140 to 185 psig, thereby catalytically reacting isobutene with said alcohol to form C_1 or C_2 tertiary C_4 ether, and;

(2) distilling the resulting mixture comprising said ether and unreacted materials in said first zone,

(3) removing from said first zone a first overhead fraction comprising principally unreacted C_4 hydrocarbons and containing minor amounts of ether and alcohol as an azeotrope into a second zone, said second zone being a distillation zone operated at a pressure in the range of 0 to 100 psig thereby producing a second overhead having a reduced amount of alcohol therein from said first overhead, condensing a portion of said first overhead, said condensed portion containing substantially all of said ether and a portion of said alcohol of said first overhead and returning said condensed portion to said first zone,

(4) withdrawing said second overhead from said second zone and,

(5) withdrawing an ether product substantially free of alcohol from the bottom of said first zone.

4,504,688

PROCESS FOR THE PREPARATION OF PURE ALKYL TERT-ALKYL ETHERS AND HYDROCARBON RAFFINATES WHICH ARE LARGELY FREE FROM ISOOLEFINS AND FROM ALKANOLS

Jens Herwig, Cologne; Hans-Volker Scheef; Bernhard Schleppinghoff, both of Dormagen, and Peter M. Lange, Leverkusen, all of Fed. Rep. of Germany, assignors to EC Erdolchemie GmbH, Cologne and Bayer Aktiengesellschaft, Leverkusen, both of, Fed. Rep. of Germany

Continuation of Ser. No. 385,226, Jun. 4, 1982, abandoned. This application Mar. 7, 1984, Ser. No. 587,094

Claims priority, application Fed. Rep. of Germany, Jun. 19, 1981, 3124293

Int. Cl.³ C07C *41/05, 41/36*

U.S. Cl. 568—697 **24 Claims**

1. A process for the preparation of pure alkyl tertiary alkyl ethers and hydrocarbon raffinates which are substantially free from tertiary olefins and alkanols which comprises:

(a) contacting an alkanol and a hydrocarbon mixture containing at least one tertiary olefin in a reaction zone, said alkanol being present in a stoichiometric excess;

(b) removing the reaction product from the reaction zone and absorbing excess alkanol in said reaction product or a partial stream thereof by absorption on a synthetic ion exchanger containing groups which exchange cations or anions or mixture of such ion exchangers, said absorbing conducted in the liquid phase;

(c) following absorption of at least a portion of said alkanol on said synthetic ion exchanger, desorbing said alkanol by contacting the same with feed hydrocarbon mixture containing at least one tertiary olefin, said desorbing conducted in the liquid phase.

4,504,689

PROCESS FOR THE PREPARATION OF PHENATES SUBSTITUTED BY HALOGEN GROUPS OR OF THE CORRESPONDING PHENOLS

Serge Veracini, 36 Avenue de Ménival, 69005, Lyon, France

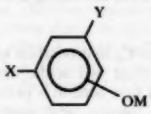
Filed Jun. 29, 1983, Ser. No. 509,062

Claims priority, application France, Jun. 29, 1983, 82 11616

Int. Cl.³ C07C *39/24*

U.S. Cl. 568—778 **19 Claims**

1. A process for preparing a compound of the formula:



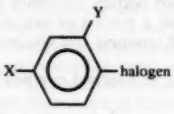
wherein:

X is selected from the group consisting of halogen and trifluoromethyl;

Y is selected from the group consisting of hydrogen, halogen, trifluoromethyl and alkyl having 1 to 4 carbon atoms provided that when Y is halogen, X is trifluoromethyl; and

M is selected from the group consisting of hydrogen, alkali metal cation and alkaline earth metal cation;

which comprises reacting in the presence of an aprotic polar solvent, a compound having the formula:



with a powdered basic component selected from the group consisting of alkaline earth and alkali metal hydroxides, and mixtures thereof, said powdered components having a particle size of less than 4 mm; said reaction taking place at a temperature between about 50° C. and about 120° C.

4,504,690

ORGANOPHOSPHORUS-TREATED ZEOLITE CATALYSTS FOR PARA-SELECTIVE AROMATICS CONVERSION

Nancy P. Forbus, Newtown, Pa., and Warren W. Kaeding, Lawrenceville, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 489,424, Apr. 28, 1983, Pat. No. 4,469,806, which is a continuation-in-part of Ser. No. 359,560, Mar. 18, 1982, Pat. No. 4,409,132. This application May 25, 1984, Ser. No. 614,195

Int. Cl.³ C07C *2/68*

U.S. Cl. 585—466 **8 Claims**

1. A process for conversion of aromatic compounds to a dialkyl benzene compound mixture enriched in the paradialkylbenzene isomer, said process comprising contacting said aromatic compounds with an alkylating agent under conversion conditions with a catalyst comprising both a crystalline zeolite material having a constraint index within the approximate range of 1 to 12 and a silica/alumina mole ratio of at least 12 and a minor proportion of one or more difficultly reducible oxides, said catalyst being prepared by a method comprising contacting said catalyst with a vapor phase organophosphorus reagent selected from C_{1-4} alkyl phosphite esters, C_{1-4} alkyl phosphate esters and dimethylmethylphosphonate, at a temperature of 100° C. to 300 ° C. and for a period of time and under conditions sufficient to either enhance para-selectivity of said catalyst or to reduce the susceptibility of said catalyst to deselectivation by contact with moisture or halogen.

4,504,691

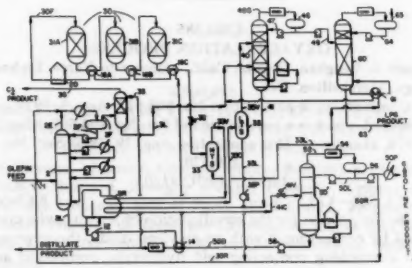
OLEFIN FRACTIONATION AND CATALYTIC CONVERSION SYSTEM

Chung-hweng Hsia, Matawan; Hartley Owen, Belle Mead, and Bernard S. Wright, East Windsor, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 508,959, Jun. 29, 1983, Pat. No. 4,471,147, and a continuation-in-part of Ser. No. 508,907, Jun. 29, 1983, Pat. No. 4,450,311. This application Jun. 1, 1984, Ser. No. 616,376

Int. Cl.³ C07C *2/02*

U.S. Cl. 585—519 **7 Claims**



1. An improved catalytic process for converting an olefinic feedstock comprising ethylene and C_3^+ olefins to heavier liquid hydrocarbon product comprising the steps of:

(a) prefractionating the olefinic feedstock to obtain a gaseous stream rich in ethylene and a liquid stream containing C_3^+ olefin;

(b) vaporizing and contacting the liquid stream from the prefractionating step with hydrocarbon conversion oligomerization catalyst in at least one exothermic catalytic reaction zone at elevated temperature and pressure to provide a heavier hydrocarbon effluent stream comprising heavy, intermediate and light hydrocarbons;

(c) flashing the effluent stream between the reaction zone and a first phase separation zone by reducing pressure of the effluent stream, thereby producing a first liquid effluent fraction rich in heavy hydrocarbons and a first effluent vapor stream containing intermediate and light hydrocarbons;

(d) condensing a portion of the first effluent vapor stream in a second phase separation zone to produce a second liquid effluent stream rich in intermediate boiling range hydrocarbons and a second vapor stream rich in light hydrocarbons;

(e) recycling at least a portion of the second liquid effluent stream as a liquid sorbent stream to prefractionating step (a);

(f) further reacting the recycled gasoline together with sorbed C_3^+ olefin in the catalytic reactor system of step (b); and

(g) exchanging heat between hot vapor from the first phase separation zone and prefractionator bottom liquid rich in

C_3^+ olefin in a prefractionator sorption reboiler loop, thereby partially condensing the first vapor stream.

4,504,692

PROCESS FOR PRODUCING 1,3-BUTADIENE

Masatoshi Arakawa; Hayao Yoshioka, and Kazuyoshi Nakazawa, all of Tokyo, Japan, assignors to Japan Synthetic Rubber Co., Ltd., Tokyo, Japan

Filed Mar. 9, 1984, Ser. No. 588,085
Claims priority, application Japan, Mar. 14, 1983, 57-40572
Int. Cl.³ C07C *5/09, 5/333*
U.S. Cl. 585—633 **4 Claims**

1. A process for producing 1,3-butadiene which comprises feeding a fraction comprising as the main components C_4-paraffins and C_4-olefins but substantially free from isobutene, 1,3-butadiene and C_4-acetylenes to a dehydrogenation or oxidative dehydrogenation step (step A); converting the n-butenes contained therein to 1,3-butadiene in step A; feeding the resulting hydrocarbon fraction containing 1,3-butadiene (fraction C) to an extractive distillation column (column B); and distilling said fraction in the presence of a selective solvent in column B while withdrawing a fraction comprising as the main component C_4-paraffins from the top of column B, withdrawing as a side stream a fraction comprising n-butenes as the main component from a stage on the upper side of the fraction C-feeding stage and on the lower side of the selective solvent-feeding stage and recycling the side stream to step A, and while withdrawing a fraction comprising 1,3-butadiene as the main hydrocarbon component and also containing the selective solvent component from the bottom of column B and separating 1,3-butadiene therefrom.

4,504,693

CATALYTIC CONVERSION OF OLEFINS TO HEAVIER HYDROCARBONS

Samuel A. Tabak, Wenonah; Bernard S. Wright, East Windsor, and Hartley Owen, Belle Mead, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

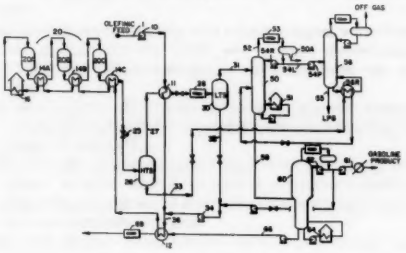
Filed Jun. 1, 1984, Ser. No. 616,379
Int. Cl.³ C07C *2/02*
U.S. Cl. 585—520 **10 Claims**

1. A continuous process for converting a feedstock mixture comprising lower olefins to form higher hydrocarbons comprising a major amount of distillate product comprising the steps of:

combining olefinic feedstock with a pressurized liquid diluent stream comprising a major fraction of C_5^+ olefins;

contacting the diluted feedstock with a shape selective medium pore acid zeolite oligomerization catalyst under reaction conditions at elevated temperature in a pressurized reactor zone to convert olefins to heavier hydrocarbons;

reducing pressure on reaction effluent in a first phase separation zone to flash volatile components into a first vapor phase stream and recovering a heavy liquid stream from the first phase separation zone;



condensing a portion of the first vapor phase stream by cooling and recovering a gasoline-rich liquid stream to provide the dominant portion of a liquid olefinic recycle stream for combining with the feedstock; and

fractionating the heavy liquid stream from the first phase separation zone to recover a heavy distillate hydrocorbon major liquid product stream, a minor gasoline liquid product stream and light hydrocarbons.

4,504,694

OLEFIN METATHESIS AND CATALYST

Simon G. Kukes, and Robert L. Banks, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

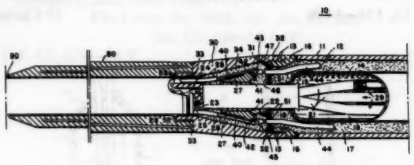
Filed Sep. 28, 1983, Ser. No. 536,819
Int. Cl.³ C07C *6/00*
U.S. Cl. 585—643 **11 Claims**

1. A process for disproportionating olefins comprising contacting at least one feed olefin having at least 3 carbon atoms per molecule under suitable reaction conditions which convert the feed olefin into other olefins having different numbers of carbon atoms with a catalytically effective amount of a catalyst composition comprising an inorganic refractory material and at least one metal oxide selected from molybdenum oxide and tungsten oxide promoted with an effective promoting amount of at least one of a chlorinated silicon compound, thionyl chloride, and sulfuryl chloride.

4,504,695
POWER CABLE JOINT

Gregory N. Fontaine, Rye, and Richard T. Traut, Dover, both of N.H., assignors to Simplex Wire & Cable Company, Portsmouth, N.H.

Filed Jul. 26, 1983, Ser. No. 517,350
Int. Cl.[3] H02G *15/08*
U.S. Cl. 174—21 R 13 Claims



1. In a coupling for two sections of an electric power cable, each section of the power cable having an inner conductor, an insulating sheath about the inner conductor, an armored winding layer comprised of a plurality of wrapped armor rods and an insulating layer about the armored winding layer, the coupling comprising the combination of:

a. a rigid splice housing partially filled with a hardened electrically insulating material for transferring the strength and stability of the sheath and armored winding layer across the coupling;

b. means for maintaining the sheath electrically insulated from the armored winding layer across the coupling;

c. means for maintaining the sheath electrically insulated from an exterior environment of the cable across the coupling;

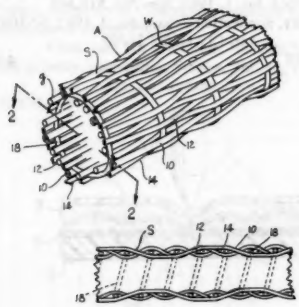
d. means for maintaining the armored winding layer electrically insulated from the exterior environment of the cable across the coupling; and

e. means for providing electrical continuity of the armored rods across the coupling.

4,504,696
TUBULAR WOVEN CONTROLLED IMPEDANCE CABLE

Douglas E. Piper, Greenville, S.C., assignor to Woven Electronics Corporation, Mauldin, S.C.

Filed Apr. 4, 1983, Ser. No. 481,755
Int. Cl.[3] H01B *7/04, 13/00*
U.S. Cl. 174—32 8 Claims



1. A woven tubular controlled impedance electrical transmission cable comprising:

a number of warp elements which include a plurality of signal conductors for transmitting high-frequency electrical signals extending in a warp direction and a ground conductor extending in the warp direction on each side of each said signal conductor, each said signal conductor and ground conductors on the sides of the signal conductor defining a cluster of warp conductor elements whereby a plurality of said clusters are formed in said cable;

a continuous weft element woven with said warp elements to define a tubular woven cable having an open interior, said signal conductors being arranged around a periphery of said open interior of said cable so that a vertical component of spacing is provided between said signal conductors;

said ground wires isolating next adjacent signal wires from one another laterally while said vertical displacement isolates said signal conductors vertically from one another;

said signal conductors being woven with said weft element so as to have an undulating configuration woven along the length of said cable;

said vertically displaced signal conductors undulating with respect to each other to provide a non-parallel relationship between said signal conductors reducing signal interference therebetween; and

said weft element being woven continuously through said clusters of warp conductors to provide continuously woven tubular woven fabric and cable around the entire periphery of said cable;

whereby said signal conductors are isolated laterally and vertically to effectively isolate said signal conductors from signal interference from one another and provide a controlled impedance cable characteristic.

8. A method of weaving a controlled impedance electrical transmission cable to provide lateral and vertical displacement between signal conductors extending longitudinally in said cable comprising:

providing a plurality of warp elements including a number of warp conductor elements;

arranging said warp conductor elements in clusters, each said cluster including a signal conductor for transmitting high-frequency electrical signals and a ground conductor on each side of said signal conductor;

providing a weft element;

weaving said weft element with said warp elements to define a tubular woven cable having an open interior with said clusters arranged around a periphery of said open cable interior so that said arrangement about said periphery provides a vertical component of spacing between signal conductors of said clusters; and

weaving said signal conductors with said weft element in an undulating manner so that corresponding signal conductors in opposing relation around said periphery have a non-parallel relation reducing noise producing fields therebetween preserving signal integrity.

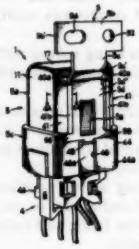
4,504,697
SEALED ELECTRICAL DEVICES

Howard R. Chapin, Park Ridge, and Arnold E. Gurley, Evanston, both of Ill., assignors to Littelfuse, Inc., Des Plaines, Ill.

Filed Apr. 28, 1982, Ser. No. 372,615
Int. Cl.[3] H05K *5/00*
U.S. Cl. 174—52 R 7 Claims

1. In a combination including a support base, an electrical device on the inner side of said support base, said support base having longitudinally-exposed terminals on the outside of said support base for feeding current to said device, and a housing having a device-enclosing portion covering and surrounding said device on the inner side of said support base, and an intermediate portion forming a continuation of said device-enclosing portion, which intermediate portion makes face-to-face engagement with at least longitudinally outwardly facing surfaces of said support base so that there is little or no straight-on access of a water stream external to said housing into the interior of said housing on the inner side of said support base from either a lateral or longitudinal direction, said intermediate portion terminating in a skirt-forming end portion extending a substantial distance longitudinally beyond said sealed portion of said support base to act as a further barrier against the

ingress of an external water stream into the interior of said housing on the inner side of said support base, the improvement wherein said support base has longitudinally extending wall means on the outer side thereof enclosed by said skirt portion of said housing, and said housing being secured to said support base by interlocking means on the inside of said skirt portion and the outside of said longitudinally extending wall means, said longitudinally extending wall means form connector unit guide wall means for guiding a connector unit with terminals complimentary to said exposed base terminals into mating engagement with said base terminals in only one orientation of said connector unit, and there is provided means for interlocking said housing skirt portion with a releasable locking means on said connector unit so that if the connector is pulled longitudinally outwardly before being released from said housing the forces involved will be transmitted to said housing rather than to said support base.

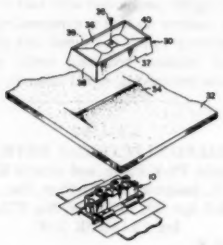


4,504,698

COVER FOR ELECTRICAL RECEPTACLE

William S. Greenwood, Nutley, N.J., assignor to Thomas & Betts Corporation, Raritan, N.J.

Filed Apr. 6, 1982, Ser. No. 365,887
Int. Cl.³ H02G *3/10*
U.S. Cl. 174—66 **14 Claims**



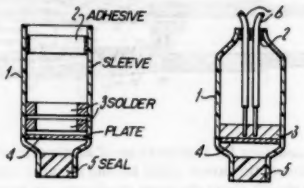
1. A cover for an electrical receptacle comprising:
a housing for enclosing said electrical receptacle;
means for securing said housing to said electrical receptacle for movement relative to said receptacle upon impacting said housing with an external load; and
a deformable housing face frictionally engageable with said receptacle upon impact of said external load for transferring a load lesser than said external load to said electrical receptacle, said housing face including an opening for accessing therein a socket portion of said receptacle, said housing face including a deformable depressed region adjacent said socket opening for engaging said socket portion of said receptacle upon said external impact on said housing.

4,504,699

SEALABLE RECOVERABLE ARTICLES

Roberto Dones, Milan, and David G. Street, Abbiategrasso, both of Italy, assignors to Raychem Pontoise S.A., Saint-Ouen l'Aumone, France

Filed Feb. 3, 1983, Ser. No. 463,684
Claims priority, application United Kingdom, Feb. 8, 1982, 8203555
Int. Cl.³ H01R *4/00*
U.S. Cl. 174—84 R **19 Claims**



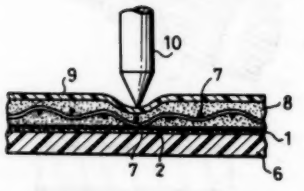
1. A device for forming and enclosing an electrical connection between a plurality of electrical conductors, which comprises:
(a) a hollow, dimensionally-recoverable article having a first and a second dimensionally-recoverable end portion and a central portion, the first end portion being open to allow insertion of electrical conductors therein and the second end portion having an aperture that communicates between the interior and the exterior of the article;
(b) an arrangement for electrically connecting electrical conductors, which is located in the central portion of the article; and
(c) a quantity of self-supporting material which is located in the second end portion and held therein by the article, wherein, at least after the article has been recovered, the material seals the aperture but can be penetrated by a probe, the material being self-sealing at least when held by the article so that it will seal the aperture after removal of a probe.

4,504,700

INPUT DEVICE

Yoshizo Kubo, and Ikuo Utagawa, both of Miyagi, Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan

Filed Jul. 1, 1983, Ser. No. 510,369
Claims priority, application Japan, Jul. 3, 1982, 57-100116[U]
Int. Cl.³ G08C *21/00*
U.S. Cl. 178—18 **4 Claims**



1. An input device, comprising: an insulator sheet (1); a resistor layer (2) formed uniformly on said insulator sheet; a plurality of terminal leads (4) connected to opposite ends of said resistor layer; an elastic, flexible insulator spacer (8) on said resistor layer having a conductive element (7) embedded therein; and an insulator protective sheet (9) mounted in overlapping relationship to cover said insulator spacer; a position in coordinates being detected from a potential associated with a

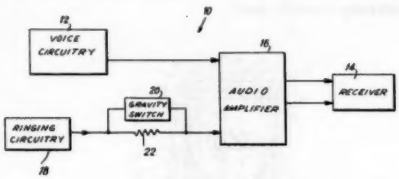
position of contact between said conductive element and said resistor layer.

4,504,701

TELEPHONE HAVING CIRCUITRY FOR REDUCING THE AUDIO OUTPUT OF THE RINGING SIGNAL

Armand P. Lucchesi, Jersey City, N.J., assignor to J. C. Penney Company, Inc., New York, N.Y.

Filed Nov. 14, 1983, Ser. No. 551,486
Int. Cl.³ H04M *1/00*
U.S. Cl. 179—84 T **14 Claims**



1. A telephone of the type having a receiver being adapted for receiving a ringing signal and being activated thereby, comprising:

ringing circuitry for processing a ringing signal;

amplifying means adapted for amplifying a processed ringing signal, said amplified ringing signal being received by said receiver;

resistive means coupled to an output of said ringing circuitry and an input of said amplifying means;

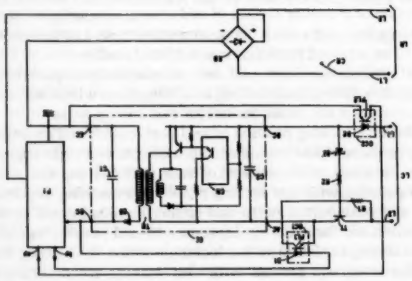
a gravity switch electrically connected in parallel to said resistive means, said gravity switch providing a ringing signal with a conducting path to said amplifying means upon said gravity switch being in a preselected position, upon said switch being tiltably displaced a predetermined degree from its preselected position said conducting path being broken and thereby necessitating transmission of said ringing signal to said amplifying means through said resistive means which attenuates, to a predetermined level, said ringing signal.

4,504,702

ADDITIONAL LINE COUPLING CIRCUIT TO AN INTERCOM TELEPHONE SET

Bernard Meunter, Le Chesnay, and Eric Gradeler, Sceaux, both of France, assignors to Compagnie Generale de Constructions Telephoniques, Paris, France

Filed Jun. 30, 1983, Ser. No. 509,790
Claims priority, application France, Jul. 12, 1982, 82 12169
Int. Cl.³ H04M *1/74*
U.S. Cl. 179—99 A **4 Claims**



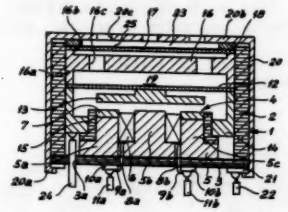
1. Additional line coupling circuit to an intercom telephone set, characterized in that it comprises, inserted between the additional line (LC) and the intercom telephone set (PI), a d.c line uncoupling circuit (CC), as well as means (OC1) coupled to one of the wires (L3) of the additional line for transmitting signals on the line (LC), and means (OC2) connected to another wire (L4) of the additional line wires for receiving the signals transmitted on the line.

4,504,703

ELECTRO-ACOUSTIC TRANSDUCER

Ali Schneiter, Neuchatel; Jean-Frédéric Flückiger, and Anne Curchod, both of Colombier, all of Switzerland, assignors to Asulab S.A., Bienne, Switzerland

Continuation of Ser. No. 381,964, May 25, 1982,. This application Aug. 16, 1984, Ser. No. 641,416
Claims priority, application Switzerland, Jun. 1, 1981, 558/81
Int. Cl.³ H04R *1/22*
U.S. Cl. 179—102 **11 Claims**



1. An electro-acoustic transducer which is capable of operating as an emitter and as a pick-up for acoustic waves in an ambient medium, comprising:

a receptacle having an opening for communication with said ambient medium;

first and second diaphragms which are spaced from each other within said receptacle, said second diaphragm being capable of vibrating under the effect of acoustic waves and being disposed between said first diaphragm and said opening;

first means for vibrating said first diaphragm in response to an electrical excitation signal when the transducer is operating in an emitter mode;

coupling means for transmitting the vibrations of said first diaphragm to said second diaphragm; and

second means, connected to the second diaphragm, for producing an output signal in direct response to vibrations of said second diaphragm which are produced by acoustic waves which are propagated in said ambient medium when the transducer is operating in a pick-up mode.

4,504,704

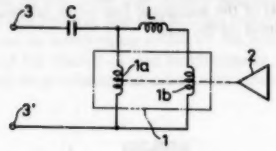
LOUDSPEAKER SYSTEM

Takashi Ohyaba; Minoru Kamishima; Shozo Kinoshita; Tetsuo Kawamura, and Hiroaki Matsuhisa, all of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Aug. 30, 1983, Ser. No. 527,722
Claims priority, application Japan, Aug. 31, 1982, 57-131720[U]
Int. Cl.³ H04R *3/08*
U.S. Cl. 179—115.5 DV **6 Claims**

1. A loudspeaker system including a dynamic loudspeaker unit, said loudspeaker unit comprising: a bobbin; a voice coil having first and second windings both wound around said

bobbin, said first winding being connected in series to an inductor to form a series circuit, said series circuit and said second



winding forming a parallel circuit; and a capacitor connected in series to said parallel circuit.

4,504,705

RECEIVING ARRANGEMENTS FOR AUDIO FREQUENCY SIGNALS

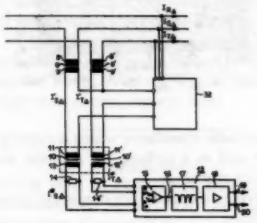
Bernard Pilloud, Steinhausen, Switzerland, assignor to LGZ Landis & Gyr Zug AG, Zug, Switzerland

Filed Jan. 5, 1983, Ser. No. 455,642

Claims priority, application Switzerland, Jan. 18, 1982, 262/82

Int. Cl.³ H04M *11/00*

U.S. Cl. 179—2.51 **11 Claims**



1. A receiver circuit for decoupling audio frequency signals from an alternating current distribution network, said signals being in a frequency range whose lowest most value is f_c, said network including at least a first transformer comprising primary and secondary windings, said receiver being coupled to said network by way of a primary winding of a second transformer, said primary winding of said second transformer being coupled to the secondary winding of said first transformer,

said receiver comprising

(a) a secondary winding of said second transformer, said secondary winding of said second transformer having an inductance and an ohmic resistance; and

(b) a load resistance connected to said secondary winding of said second transformer,

said ohmic resistance, said inductance, and said load resistance being adapted to form a high pass filter capable of passing frequencies in said range including said lowest most frequency f_c.

4,504,706

ROTARY PULSE SWITCH

Yuji Watanabe, Miyagi, and Takeshi Yamashita, Furukawa, both of Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan

Filed Oct. 11, 1983, Ser. No. 540,820

Claims priority, application Japan, Oct. 8, 1982, 57-152145[U]

Int. Cl.³ H01H *19/60*

U.S. Cl. 200—11 R **11 Claims**

1. A rotary pulse switch comprising:

a case;

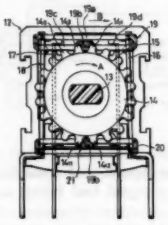
an operating shaft extending through said case and supported rotatably by said case;

a rotor having a plurality of projections disposed equidistantly on the outer circumferential surface;

contact pairs, each consisting of a fixed contact and a movable contact, positioned closer to the center than at least the outer circumferential edge of said rotor with said operation shaft between said contact pairs;

an operating member disposed between said contact pairs and capable of sliding movement to a position closer to the outer circumferential surface of said rotor;

a contact operating member extending from the side of said operating member; and



a projection provided so as to project from the center of said operating member and able to engage with and disengage from said projections of said rotor;

said movable contacts being positioned at either end of said contact operating member so as to face each other;

said contact operating member pushing one of said movable contacts and bringing it into contact with the corresponding fixed contact when said operating member is moved in accordance with the rotation of said rotor through a desired angle and thereafter returning by the resilient force of the movable contact.

4,504,707

PUSH-BUTTON SWITCH LOCKING DEVICE FOR USE IN ELECTRIC APPLIANCE

Masahiko Ochiai, Nogata, Japan, assignor to Kyushu Hitachi Maxell, Ltd., Fukuoka, Japan

Filed Mar. 14, 1983, Ser. No. 475,156

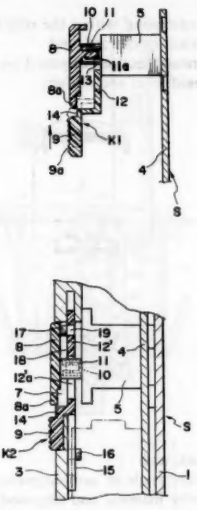
Claims priority, application Japan, Mar. 15, 1982, 57-36698[U]; May 17, 1982, 57-72843[U]; Jul. 8, 1982, 57-104664[U]; Jul. 8, 1982, 57-104666[U]

Int. Cl.³ H01H *9/28*

U.S. Cl. 200—42 R **7 Claims**

1. A push-button switch locking device for use in an electric appliance, comprising: a casing; a push-button mounted on a portion of the outer surface of said casing; a switch provided in said casing, said switch being connected to said push-button so as to be actuated upon depression of said push-button such that said push-button and said switch constitute a push-button switch; a sliding knob having a locking piece which is slidably mounted on the outer surface of said casing so as to be slid between a locking position of said push-button and an unlocking position of said push-button in a direction at right angles to the direction of depression of said push-button; and means cooperating with said locking piece for preventing depression of said push-button when said sliding knob is in said locking position and for allowing depression of said push-button when said sliding knob is in said unlocking position, said sliding knob being integrally formed with said locking piece through a stepped portion such that upon actuation of the sliding knob perpendicular to the depression of said push-button, the locking piece cooperates with said means thereby preventing the actuation of the switch by preventing depression of the push-

button and at the same time the stepped portion engages the lower end portion of the push-button to support said push-button and positively prevent the depression of the push-button at its locked position.



4,504,708

DISCONNECT SWITCH

Alfred Hartig, Essen, Fed. Rep. of Germany, assignor to Ruhrtal-Elektrizitätsgesellschaft Hartig GmbH & Co., Essen, Fed. Rep. of Germany

Division of Ser. No. 476,358, Mar. 17, 1983,. This application Dec. 7, 1983, Ser. No. 558,957

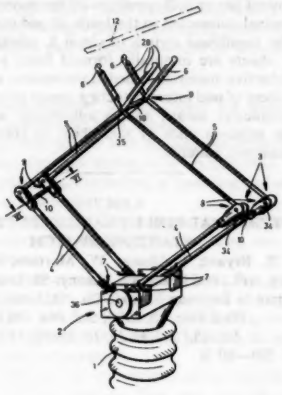
Claims priority, application Fed. Rep. of Germany, Mar. 17, 1982, 3209667; Sep. 24, 1982, 3235379; Sep. 24, 1982, 3235380

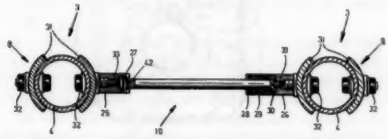
Int. Cl.³ H01H *31/36*

U.S. Cl. 200—48 V 5 Claims

1. In an electrical switch comprising a pair of parallelogrammatic linkages disposed in two parallel planes, each of said linkages including a pair of scissor arms terminating in contactors operable to grip an elongate countercontact transverse to said planes, the scissor arms of each linkage being articulated to each other and to a pair of coacting arms by respective pivotal junctions, at least one pair of corresponding junctions of said linkages being interconnected by spacing means for simultaneous displacement of the respective scissor arms relative to said countercontact,

the improvement wherein said spacing means comprises a substantially nondeformable rod member engaging said corresponding junctions by means of couplings with enough play to permit limited relative motion of said linkages in at least one dimension.





4,504,709

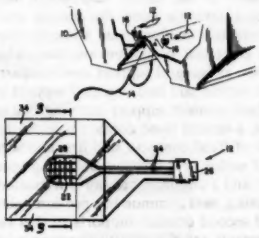
MEMBRANE SWITCH FOR HOPPER

Dale E. Gandrud, Owatonna, Minn., assignor to Gandy Company, Owatonna, Minn.

Filed Feb. 23, 1984, Ser. No. 582,952

Int. Cl.³ H01H *13/70*

U.S. Cl. 200—52 R 15 Claims



1. A membrane switch, which comprises:

a bottom sheet of nonconductive material;

a top sheet of nonconductive material overlying said bottom sheet;

conductive means between said top and bottom sheets defining an open contact, leads extending outwardly from the open contact, and a contactor aligned with the contact;

means for including a spacer sheet extending adjacent to only one side of said conductive means interconnecting said top and bottom sheets in predetermined closely spaced apart relationship to define a narrow envelope therebetween;

the contact and contactor of said conductive means being normally spaced apart in open relationship but responsive to relative positioning of said top and bottom sheets to control the on/off condition of the switch; and

a terminal connected to the leads of said conductive means.

3. The membrane switch of claim 1, wherein said top and bottom sheets are integrally formed from a single piece of nonconductive material folded transversely, and wherein the spacer sheet of said interconnecting means overlies the leads of said conductive means and is adhesively secured between opposite adjacent ends of said sheet of transversely folded nonconductive material.

4,504,710

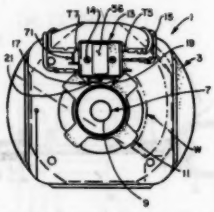
DUAL TERMINAL FOR DYNAMOELECTRIC MACHINE STARTING SWITCH

Jimmy R. Bryant; Waldemar W. Mertens, both of Greene County, Ark., and Frances A. Kenny, St. Louis County, Mo., assignors to Emerson Electric Co., St. Louis, Mo.

Filed Dec. 13, 1982, Ser. No. 448,949

Int. Cl.³ H01H *35/10*; H02K *11/00*

U.S. Cl. 200—80 R **1 Claim**



1. In a dynamoelectric machine having a stator and a rotor, said stator comprising a core having a bore therethrough for rotatably receiving said rotor, said rotor having a shaft, said stator further including a bearing support for receiving and journalling said rotor shaft, said stator further comprising a plurality of coils of wire constituting the windings of said dynamoelectric machine, a centrifugal actuator rotatable with said rotor shaft, a starting switch carried by said stator, said switch having a plurality of terminals connected to a plurality of leads which are in turn connected to said windings for energization of said motor, said switch being actuable by said centrifugal actuator upon the startup and shutdown of said dynamoelectric machine, said switch comprising a housing of suitable electrical insulative material, wherein improvement comprises: an integral support member carrying a pair of fixed contacts within said housing, said support member comprising a first fixed contact support carrying one of said pair of fixed contacts, a second fixed contact support carrying the other of said pair of fixed contacts, said first and second supports being disposed within said housing and being spaced apart from one another, and a common bus portion located on the exterior of said housing, said common bus portion being integral with said first and second contact supports so that said first and second fixed contacts are electrically common with one another.

4,504,711

VACUUM SWITCHING TUBE HAVING MAGNETIC FIELD ELECTRODES

Karl Zuckler, Berlin, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Feb. 18, 1983, Ser. No. 467,806

Claims priority, application Fed. Rep. of Germany, Feb. 23, 1982, 3206823

Int. Cl.³ H01H *33/66*

U.S. Cl. 200—144 B **5 Claims**

1. A switching tube comprising a housing, a pair of electrodes movably disposed relative to each other in the housing and respective current conductor rods supporting the respective electrodes, each electrode comprising:

(a) a field winding ring which includes:

(1) a ring,

(2) a bridge extending within the ring between inner peripheral locations thereof, and

(3) a pair of raised sections disposed on the ring diametrically opposed from each other;

(b) a main contact; and

(c) a support plate made of non-magnetic and electrically low-conductivity material and disposed on the ring, the support plate having cutouts through which the respective raised sections extend to the main contact, the main contact being supported by the support plate and in contact with the raised sections.

4,504,712

PLUNGER SWITCH WITH PIVOTED ACTUATOR

James Donnelly, and Milton N. Ives, both of Wolcott, Conn., assignors to Carlingswitch, Inc., West Hartford, Conn.

Filed Nov. 7, 1983, Ser. No. 549,399

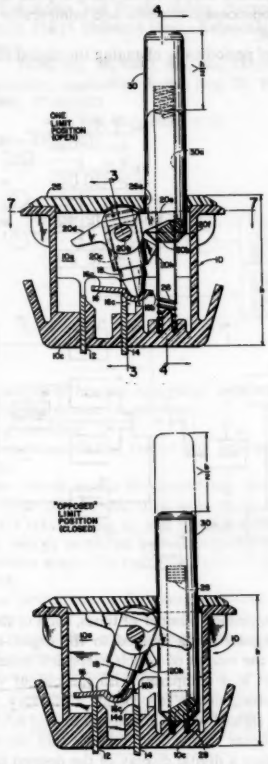
Int. Cl.³ H01H *13/52*

U.S. Cl. 200—159 R **14 Claims**

1. An electric switch mechanism comprising;

an upwardly open switch case having a bottom wall and side walls integrally connected to one another, at least two fixed contacts in the bottom wall and a movable contact adapted to bridge said two fixed contacts in a closed switch condition and to be held in contact with only one of said fixed contacts in a switch open condition, actuator means pivotally received in said switch case and movable between opposed limit positions corresponding to said respective switch conditions, said actuator means coupled to said movable contact to achieve said switch open and switch closed conditions in response to pivotal movement of said actuator means, a cover for said switch case, said cover spaced above said bottom wall, a plunger slidably received in an opening provided for it in said cover, said plunger movable between upper and lower limit positions spaced vertically from one another by at least one half the said spacing between said bottom wall and said cover said actuator means having laterally projecting axial portions pivotally received in aligned openings provided therefor in said switch case side walls, said actuator means being covered by said case cover and having radially opposed projecting abutments for engaging the underside of said cover in said limit positions respectively for said actuator means, said acutator means having a projection (20*b*) adapted to being engaged by said plunger to move said actuator means only during initial downward movement of the plunger, said plunger being movable downwardly beyond said initial movement without corresponding movement of said actuator means, and biasing means

urging said plunger upwardly, one of said radially projecting abutments having a portion (*20f*) engaged by a plunger



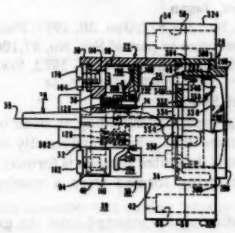
portion (*30b*) to reset said actuator as said plunger moves upwardly into said upper limit position.

4,504,713

PUSH BUTTON ELECTRICAL SWITCH ASSEMBLY

Thomas M. Hennessey, Kenosha, Wis., assignor to Adams Elevator Equipment Company, Skokie, Ill.

Filed Jul. 13, 1983, Ser. No. 513,509
Int. Cl.³ H01H *1/24*
U.S. Cl. 200—241 **7 Claims**



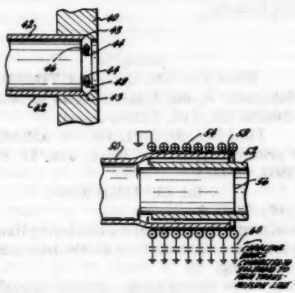
1. A push button electrical switch assembly, comprising:
a housing including a first electrical contact,
a contact carrier including an actuator having a second electrical contact,
means mounting said actuator within said housing for movement between first and second axial limits, with at least one of said limits being a contact engaging position,
biasing means urging said actuator towards its second axial limit,
a cover,
and a push button mounted in said cover for movement between first and second axial limits,
said cover being disposed on said housing, with the biased actuator urging the push button to its second axial limit,
said first electrical contact including at least first and second spaced contact members,
said second electrical contact including at least one metallic bridging member for engaging said at least two fixed contact members,
said bridging contact member being held in a first position by said biasing means, and pivoting upon engagement with said at least two fixed contact members, against the bias of said biasing means, to a second position, to provide a contact-wiping engagement,
said housing including first and second spaced spring seats,
said bridging member having first and second spaced contact fingers, and first and second spaced openings,
said biasing means including first and second compression springs having first and second ends, with their first ends being disposed in said first and second spaced spring seats, respectively,
said contact carrier including first and second resilient leg elements with said first and second resilient leg elements snapping into the first and second openings, respectively, of the bridging member, and into the second ends respectively, of the first and second compression springs, to provide the functions of securing the bridging contact to the contact carrier while defining a predetermined fixed range of pivotable movement, and also functioning as spring bosses for the first and second compression springs.

4,504,714

SYSTEM AND METHOD FOR IMPACT WELDING BY MAGNETIC PROPULSION

Jack Katzenstein, 855 Haverford Rd., Ramona, Calif. 92065

Filed Nov. 2, 1981, Ser. No. 317,560
Int. Cl.³ B23K *13/00*; H05B *5/00, 6/00*
U.S. Cl. 219—9.5 **13 Claims**



1. A system for impact welding by magnetic propulsion for butt welding of substantially flat plates comprising:
at least one ballistic work piece member in the form of a substantially straight bar aligned with a stationary work piece to be welded; and
driving coil means disposed adjacent said at least one ballistic work piece member and connectable to a power source such that upon actuation of said power source said driving

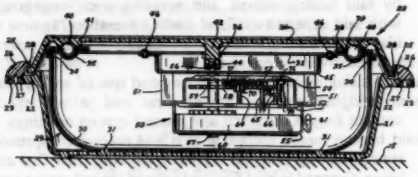
coil means produces approximately 2×10^6 to 3×10^6 psi of magnetic pressure on said ballistic member to propel said ballistic work piece member to collide with said stationary work piece member at welding velocity.

4,504,715

PORTABLE TURNTABLE FOR USE IN MICROWAVE OVENS

Jorgen A. Jorgensen, Bloomington, and Donald W. Nygren, St. Louis Park, both of Minn., assignors to Northland Aluminum Products, Inc., Minneapolis, Minn.

Continuation of Ser. No. 927,928, Jul. 25, 1978, Pat. No. 4,258,630. This application Feb. 20, 1981, Ser. No. 236,170
The portion of the term of this patent subsequent to Mar. 31, 1998, has been disclaimed.
Int. Cl.³ H05B *6/78*
U.S. Cl. 219—10.55 F **9 Claims**



1. In a portable turntable for use in microwave ovens to rotate a container containing a food product cooked within the oven,

(a) a pan shaped base having a flat bottom and an upright peripheral side wall,

(b) a cover disposed in covering position over the base rotatably mounted to the base,

(c) a metal housing fixedly connected to the base,

(d) a motor enclosed within the housing and having a driving connection with the cover to rotate said cover,

(e) said base, cover and driving connection being formed of a dielectric material,

(f) means for energizing the motor,

(g) said metal housing being relatively smooth and unencumbered with sharp edges throughout its entire exterior surface, and

(h) an aperture in said metal housing of a size to receive said driving connection therethrough but sufficiently small to effectively eliminate microwave energy from the interior of said housing.

4,504,716

ELECTRONIC DIGITAL TIMER

Kazuho Sakamoto, Kyoto, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 31, 1981, Ser. No. 336,043
Claims priority, application Japan, Jan. 13, 1981, 56-4824; Jan. 13, 1981, 56-4825
Int. Cl.³ H05B *6/64*
U.S. Cl. 219—10.55 B **3 Claims**

1. An electronic digital timer for displaying time information and time interval information on an electronic digital display device, comprising:

at least one time setting knob rotatable through a selectable angle representative of a selected time interval;

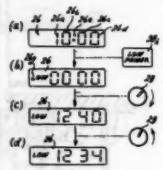
time setting circuit means responsive to the rotation of said time setting knob for producing an output voltage corresponding to the selected position of said time setting knob;

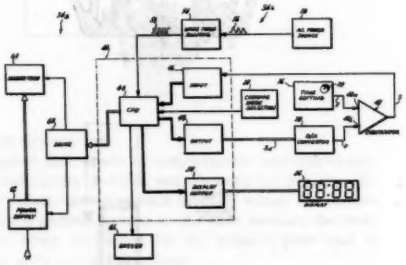
microcomputer means for producing a digital reference input signal;

digital-to-analog converter means for receiving said digital reference input signal and producing therefrom an analog signal;

comparator means for comparing the output voltage of said time setting circuit means with the analog signal produced by said digital-to-analog converter and producing a comparator output signal indicative of said comparison, said comparator output signal being applied to an input of said microprocessor wherein said comparator output signal is stored;

means of periodically changing the digital reference signal a





pre-determined number of times, each of the digital reference signals being applied to the digital-to-analog converter the output of which is applied to said comparator wherein it is compared with the output voltage of said time setting means to produce a plurality of comparator output signals which are stored in said microcomputer;

display means coupled to receive said stored signals for producing a digital display of the desired time interval.

4,504,717

SELF-CLEANING COATING COMPOSITIONS AND COOKING APPARATUS COATED THEREWITH

Nobushige Arai, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 229,522, Jan. 30, 1981, Pat. No. 4,374,754, which is a continuation-in-part of Ser. No. 57,106, Jul. 12, 1979, abandoned. This application Oct. 8, 1982, Ser. No. 433,525
Int. Cl.³ H05B *6/64*
U.S. Cl. 219—10.55 E **28 Claims**

10. A cooking apparatus including an oven wall on which a self-cleaning coated film which catalytically oxidizes and removes fats and oils deposited thereon is formed, said self-cleaning coated film being formed from a coating composition comprising:

a silicone synthetic resin selected from the group consisting of straight silicone synthetic resin, silicone intermediate products, modified silicone synthetic resin and mixtures thereof; 0.1 to 30% by weight of a heat stable oxidation catalyst; and an organic solvent.

4,504,718
MICROWAVE HEATING APPARATUS WITH SOLID STATE MICROWAVE OSCILLATING DEVICE

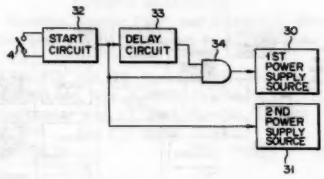
Hisashi Okatsuka, Tokyo; Koichi Taniguchi, Inuyama; Mitsuo Konno, Yokohama, and Ryuho Narita, Nagoya, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Sep. 20, 1983, Ser. No. 533,917

Claims priority, application Japan, Sep. 20, 1982, 57-163420; Sep. 20, 1982, 57-163421

Int. Cl.³ H05B *6/66*

U.S. Cl. 219—10.55 B **7 Claims**



1. A microwave heating apparatus with solid state microwave oscillating device comprising:

a heating chamber;

a solid state oscillating circuit for generating microwave energy;

amplifier circuit means for amplifying the microwave energy generated by said solid state oscillating circuit;

means for transmitting to said heating chamber the microwave energy amplified by said amplifier circuit means;

a first power source for energizing said solid state oscillating circuit;

a second power source for energizing said amplifier circuit means;

starting means for causing the heating operation of said heating chamber to start; and

control means for activating said first power supply source only after said second power supply source has been activated and said amplifier means has been in a stable state, in response to the operation of said starting means.

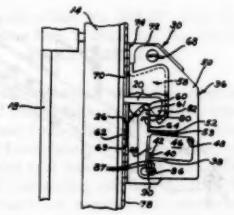
4,504,719
DOOR LATCH AND METHOD OF ASSEMBLY

Benson T. Taylor, Jr., Floyd Knobs, Ind., and Ralph G. Hawkins, Louisville, Ky., assignors to General Electric Company, Louisville, Ky.

Continuation of Ser. No. 351,083, Feb. 22, 1982, abandoned. This application Feb. 21, 1984, Ser. No. 580,296

Int. Cl.³ H05B *6/06*

U.S. Cl. 219—10.55 C **14 Claims**



1. A latch assembly in a cabinet having a front opening with a door movably mounted to said cabinet for selectively closing said opening comprising:

a latch secured to the door and projecting from the rear surface of the door,

a mounting member attached to the cabinet having a latch receiving strike plate and a resilient finger and pivotally mounted at one end thereof to a rigid cabinet member with the resilient finger abutting the cabinet and biased in a direction away from the door in its closed position, said latch and mounting member strike plate being movable relative to each other to latched and unlatched positions and cooperating to tightly retain the door in its closed position by the biasing effect of the resilient finger when in the latched position, and

means fixedly securing the mounting member against pivotal movement thereof when the latch and mounting member strike plate cooperate to tightly retain the door in its closed position.

4,504,720
HIGH FREQUENCY GENERATOR FOR WELDING APPARATUS

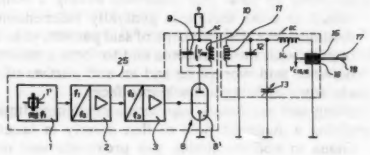
Erich Krause, Ludwigsburg, Fed. Rep. of Germany, assignor to PKM Projektionsgesellschaft, Ludwigsburg, Fed. Rep. of Germany

Continuation of Ser. No. 277,718, Jun. 26, 1981, abandoned. This application Mar. 1, 1984, Ser. No. 583,796

Claims priority, application Fed. Rep. of Germany, Jun. 30, 1980, 3024753

Int. Cl.³ H05B *6/06*

U.S. Cl. 219—10.77 **2 Claims**



1. In high frequency heating apparatus of the kind for welding plastic material, the apparatus comprising

(i) a stable radio frequency oscillator for providing a fixed frequency output,

(ii) a power amplifier driven at a fixed frequency derived from the oscillator's output, the power amplifier having a resonant output circuit in which is connected the primary of a transformer,

(iii) a load circuit comprising a decoupling network connected to welding electrodes, the decoupling network having in it the secondary of the transformer, the welding electrodes being adapted to receive between them the material to be welded, the improvement wherein

(a) the fixed driving frequency is within the resonance range of the power amplifier's output circuit but below the peak resonant frequency of that circuit in the condition where the material to be welded has not yet been heated to welding temperature,

(b) the degree of coupling between the primary and secondary of the transformer causes resonance of the power amplifier's output circuit to shift toward lower frequencies in the condition where the material to be welded is heated to welding temperature whereby the peak resonant frequency of the power amplifier's output circuit moves closer to the fixed driving frequency during the welding cycle, and

(c) the load circuit being resonant at a peak frequency that is dependent upon the state of the material to be welded when disposed between the welding electrodes whereby the peak of resonance of the load circuit shifts to a lower frequency during the welding cycle, the peak resonant frequency of the load circuit at the start of the welding cycle being higher than the peak resonant frequency of the power amplifier's output circuit by an amount greater than the shift in peak resonant frequency of the load circuit during the welding cycle.

4,504,721
3D EDM METHOD AND APPARATUS UTILIZING A MAGNETIC FIELD

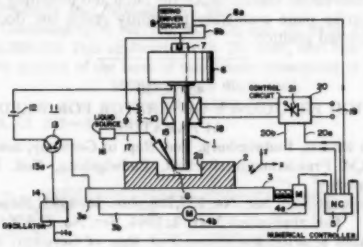
Kiyoshi Inoue, Tokyo, Japan, assignor to Inoue-Japax Research Incorporated, Yokohama, Japan

Filed Oct. 14, 1981, Ser. No. 311,451

Claims priority, application Japan, Oct. 15, 1980, 55-145757[U]; Oct. 27, 1980, 55-149369

Int. Cl.³ B23P 1/12

U.S. Cl. 219—69 M **16 Claims**



1. A method of electroerosively machining a three-dimensional pattern in a workpiece, comprising the steps of:

positioning an axial tool electrode having a simple shape which in cross section is generally independent of and dissimilar to a desired shape of said pattern, so as to axially oppose with the workpiece and to form a machining gap between said workpiece and an end portion of said tool electrode defining a machining face;

flushing said machining gap with a machining liquid;

applying a magnetic field of flux density in excess of 100 Gauss to said machining gap proximate said machining face selectively through said tool electrode;

applying successive electrical pulses between said tool electrode and said workpiece to produce through said machining gap a succession of electrical discharges affected by said magnetic field, thereby electroerosively removing material from a localized portion of said workpiece which is opposed with said machining face; and

maintaining said electrical discharges while relatively displacing said tool electrode and said workpiece multi-axially and with displacement in two mutually perpendicular directions and while maintaining said axial opposition of the tool electrode with the workpiece so as to cause said machining face and said gap traversed by said magnetic field to sweep in a scanning manner along a predetermined three-dimensional path corresponding to said desired pattern to successively shift therealong said region of localized material removal over said workpiece, thereby progressively forming said pattern therein so that said magnetic field participates in the removal of material from said workpiece across from said tool electrode.

4,504,722
FULLY AUTOMATED MACHINING APPARATUS OPTIMIZATION FOR ELECTRIC DISCHARGE MACHINING APPARATUS

Masakazu Kishi, Kawasaki, and Yasuo Suzuki, Yokosuka, both of Japan, assignors to Hitachi Seiko Ltd., Tokyo, Japan

Filed Feb. 26, 1982, Ser. No. 352,765

Int. Cl.³ B23P 1/08

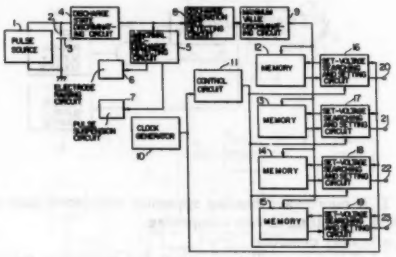
U.S. Cl. 219—69 P **18 Claims**

1. An electric discharge machining apparatus in which discharge pulses are generated between an electrode and a workpiece for spark machining of the workpiece, said apparatus comprising:

power source means for applying a pulse voltage across the electrode and the workpiece to produce discharge pulses;

discharge state detecting means coupled to said power source means for generating detection outputs representative of discharge states between said electrode and workpiece;

search means for changing a plurality of machining stabilizing conditions in a predetermined order and within a predetermined range of values of each of said machining stabilizing conditions to produce variation in the rate of generation of discharge pulses, and providing a search sequence pattern of said machining stabilizing conditions selected from one of a plurality of search sequence patterns in accordance with a choice of electrode material, workpiece material, and a working fluid supplying method;



maximum value discriminating and storing means coupled to said discharge state detecting means for discriminating a maximum value of the effective discharge generation rate throughout said change of said at least one machining stabilizing condition and storing therein the maximum value; and

optimizing machining condition storing means coupled to said maximum value discriminating and storing means for storing therein an optimized machining condition corresponding to the maximum value of the effective discharge generation rate for each machining stabilizing condition;

whereby spark machining is effected on the basis of the optimized machining condition.

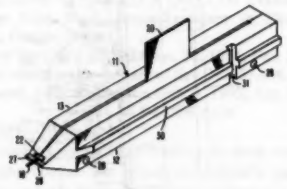
4,504,723
RENEWABLE BRAZING ELECTRODES

Frederick S. Gobran, Endwell; Fred E. Grospin, Binghamton; Donald G. Pittwood, and Myron F. Shlatz, both of Endicott, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 9, 1983, Ser. No. 559,673

Int. Cl.³ B23K 3/00

U.S. Cl. 219—85 F **7 Claims**



1. Bonding apparatus comprising:

electrode holder means having a pair of electrically conductive, mating members mutually insulated from each other and formed with a channel therebetween for receiving electrode means therein;

composite electrode means for insertion in said channel, said electrode means being formed by a pair of conductive

strips insulated from each other and being movable along said channel;

means for releasably securing said members together with said electrode therebetween and each said member being in electrical contact with a respective one of said strips; and

feed means in said holder in engagement with one end of said electrode means and operable when said securing means is released for moving said electrode means along said channel.

4,504,724

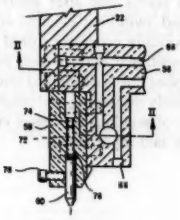
FUSING MACHINE

Charles F. Szantho, Roselle Park, and Edward D. Riordan, S. Somerville, both of N.J., assignors to Joyal Products, Inc., Linden, N.J.

Division of Ser. No. 364,218, Apr. 1, 1982, , which is a division of Ser. No. 203,446, Nov. 3, 1980, Pat. No. 4,371,772. This application Aug. 11, 1983, Ser. No. 522,323

Int. Cl.³ B23K *11/30*

U.S. Cl. 219—86.25 **3 Claims**



1. A fusing electrode assembly, comprising a fusing electrode shaft and holding means attached to said fusing electrode shaft for releasably holding a fusing electrode, said holding means including a first holding member, which is keyed to said fusing electrode shaft, said first holding member including channels which communicate with a supply of cooling medium, and a second holding member, which is keyed to said first holding member, said second holding member including first receiving means for removably receiving said fusing electrode and second receiving means, which communicates with said first receiving means, for receiving adjusting means for adjusting the position of said fusing electrode relative to said second holding member.

4,504,725

RESISTANCE WELDING APPARATUS WITH COMPOUND ELECTRODE HOLDER

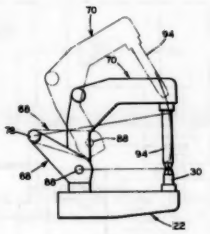
Donald J. Beneteau, 1333 Front Rd. South, Amherstburg, Ontario, Canada

Continuation-in-part of Ser. No. 545,477, Oct. 26, 1983,. This application Dec. 7, 1983, Ser. No. 558,804

Int. Cl.³ B23K *11/30*

U.S. Cl. 219—86.25 **20 Claims**

1. Apparatus for resistance welding comprising a transformer having an output face, a first output terminal block at one portion of said face, a second output terminal block at another portion of said face, pivotal supporting means extending outwardly from said transformer, a first electrode holder, means electrically connecting said first electrode holder to said first output terminal block, a main frame connected to said first electrode holder and extending away therefrom, means pivotally connecting said main frame to said pivotal supporting means, a compound electrode holder comprising a first element and a second element, a first electrode having a first axis carried by said first electrode holder, a second electrode having a second axis carried by said second element, said first and second axes being substantially aligned when said electrodes are engaged with a workpiece, means pivotally connecting one portion of said first element with said main frame, means pivotally connecting another portion of said first element to said second element on a pivotal axis which is on a line perpendicular to the axes of said electrodes when engaging a workpiece, with the line passing symmetrically through the space between the electrode tips when engaged with the workpiece and said first element is in a predetermined pivotal position, means electrically connecting said second element to said second output terminal block, stop means between said elements for



causing the elements to move together when said second element is moved away from said first electrode holder, said first element having stop means for limiting the extent to which said first element can move toward said first electrode holder, resilient means connected between said first and second elements for enabling said second element to move further toward said first electrode holder when said first element is stopped, and means for moving said second element toward and away from said first electrode holder.

4,504,726

PATTERN GENERATOR

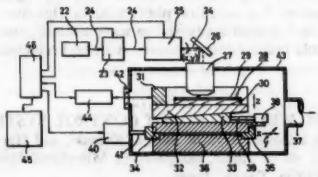
Sumio Hosaka, Hachioji; Akihiro Takanashi, Kokubunji; Toshiei Kurosaki, Tokyo; Shinji Kuniyoshi, Tokyo; Yoshio Kawamura, Tokyo, and Tsuneo Terasawa, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 4, 1981, Ser. No. 327,627

Claims priority, application Japan, Dec. 17, 1980, 55/177281

Int. Cl.³ B23K *27/00*

U.S. Cl. 219—121 LH **5 Claims**

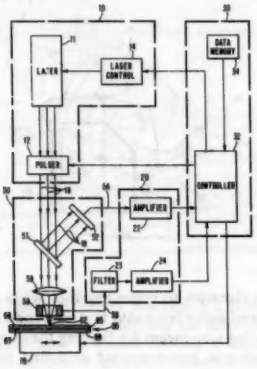


1. A pattern generator comprising a laser source, means to modulate a laser beam emitted from said laser source and to deflect it in a desired direction, means to focus the laser beam and to project it onto a workpiece to subject the workpiece to machining by the laser beam, a sample stage on which the workpiece is placed, means for moving the sample stage in three dimensions with the workpiece placed thereon, means to arrange at least the workpiece in vacuum, and means to control scanning of the laser beam in order to form a predetermined pattern on the workpiece, the predetermined pattern being directly formed in a surface of the workpiece in the vacuum by the laser beam machining.

4,504,727
LASER DRILLING SYSTEM UTILIZING PHOTOACOUSTIC FEEDBACK

Robert L. Melcher, Mount Kisco, and Sheree H. Wen, Mohegan Lake, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 30, 1982, Ser. No. 454,913
Int. Cl.³ B23K 27/00
U.S. Cl. 219—121 LB 16 Claims



1. A misregistration detector for aligning a controllable radiant energy source to a selected drill site which is made of a first material, and said drill site being surrounded by a second material, comprising:

said controllable radiant energy source being adapted for directing a beam of radiant energy to said selected drill site;

said first material having a first photoacoustic signature signal,

said second material having a second photoacoustic signature signal;

means for sensing and detecting and discriminating the photoacoustic signature signal generated when said beam of radiant energy is incident upon said selected drill site;

said photoacoustic signature signal being dependent upon the photoacoustic characteristics of the particular material to which said beam of radiant energy is being directed; and

said detecting and discriminating means producing an output upon receiving a photoacoustic signature signal containing other than said first photoacoustic signature signal,

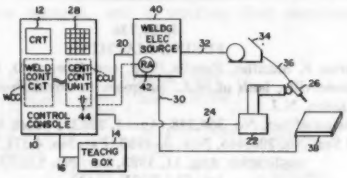
whereby said system is adapted to sense a misalignment of said controllable radiant energy source with said selected drill site.

4,504,728
ARC WELDING ROBOT CONTROL SYSTEM

Jun Ukai; Hirohisa Segawa, both of Komaki, and Haruki Ando, Nagoya, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 25, 1982, Ser. No. 411,483
Claims priority, application Japan, Aug. 31, 1981, 56-136616
Int. Cl.³ B23K 9/12, 9/10
U.S. Cl. 219—125.1 12 Claims

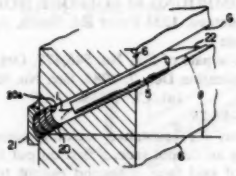
1. An arc welding robot control system for automatically moving a welding robot so as to pass th[rou]gh a plurality of points stored therein one after another, [com]prising a welded workpiece; a welding electric source for providing power for a plurality of different type of welding proceses, said source having a plurality of sets of a welding voltage and a welding current each specified for a different one of said plurality of types of welding processes, said welding electric source controlling the feed of a welding wire fed toward said workpiece and selectively supplying said plurality of sets of the welding voltage and the welding current across said workpiece and said welding wire, a switching element for changing said welding electric source so as to deliver the set of the welding voltage and the welding current specified for a desired one of said types of welding processes; a central control unit for storing therein said plurality of said types of welding processes in correspondence with said plurality of said points when said points are stored in said central control unit, said central control unit supplying to said welding robot signals for automatically moving said welding robot to pass through said plurality of said stored points one after another and also selectively applying to said switching element signals corresponding to said types of welding processes stored therein; an input means for entering positional data of said points and said types of welding processes into said central control unit; and a display unit for selectively displaying said positional data of said points and said types of welding processes entered into said central control unit by said input means.



4,504,729
THREE O'CLOCK WELDING METHOD IN NARROW GROOVE

Isao Asano, Kure, Japan, assignor to Babcock-Hitachi Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 2, 1981, Ser. No. 317,544
Claims priority, application Japan, Nov. 5, 1980, 55-154702; Nov. 11, 1980, 55-157742
Int. Cl.³ B23K 9/16
U.S. Cl. 219—137 R 13 Claims



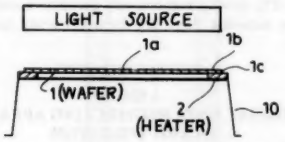
1. A three o'clock welding method in a narrow groove for forming a lateral abutted joint, the method comprising the steps of: forming a groove which tilts such that the center face of upper and lower groove faces substantially parallel to each other is lowered with respect to the horizontal on an initial layer side, and welding by depositing molten metal in a narrow groove in layers, with each layer being formed by a single pass of a welding means, and wherein an angle of inclination of said center face with respect to the horizontal is selected in accordance with a gap dimension of the narrow groove.

4,504,730

METHOD FOR HEATING SEMICONDUCTOR WAFER BY MEANS OF APPLICATION OF RADIATED LIGHT

Hiroshi Shimizu, Yokohama, Japan, assignor to Ushio Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 4, 1983, Ser. No. 538,935
Int. Cl.³ H01L 21/324; F27D 11/02
U.S. Cl. 219—411 4 Claims



1. A method for heating a semiconductor wafer by means of application of light radiated from a light source while additionally heating a circumferential portion of the semiconductor wafer by subsidiary heating means which per se is heated upon exposure to the radiated light and is arranged in contact with one of a surface of a circumferential edge and a surface portion lying in the vicinity of the circumferential edge of the semiconductor wafer, which method comprises limiting a ratio (α/β) of a characteristic value (α) of the subsidiary heating means to that (β) of the semiconductor wafer to from 0.7 to 1.3, said α and β being expressed respectively by the following formulae:

$$\alpha = \frac{1 - \eta_1}{\rho_1 \cdot d_1 \cdot C_1}$$

$$\beta = \frac{1 - \eta_2}{\rho_2 \cdot d_2 \cdot C_2}$$

where

η_1, η_2: reflectivities of the subsidiary heating means and semiconductor wafer, respectively;

ρ_1, ρ_2: specific gravities (g/cm³) of the subsidiary heating means and semiconductor wafer, respectively;

d_1, d_2: thicknesses (cm) of the subsidiary heating means and semiconductor wafer, respectively; and

C_1, C_2: specific heats (joule/g.°C.) of the subsidiary heating means and semiconductor wafer, respectively.

4,504,731

ELECTRIC HOTPLATE

Karl Fischer, Karl-Fischer-Strasse 23, D-7519 Oberderdingen, Fed. Rep. of Germany

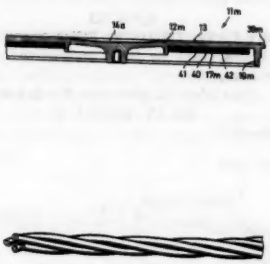
Filed Jun. 21, 1983, Ser. No. 506,539
Claims priority, application Fed. Rep. of Germany, Jun. 23, 1982, 3223417
Int. Cl.³ H05B 3/68
U.S. Cl. 219—457 16 Claims

1. An electric hotplate with a hotplate body having a substantially closed cooking surface, heated by at least one electrical heating element, the hotplate comprising:

the hotplate body formed from a metallic sintered material and having on its bottom surface a plurality of substantially spirally arranged ribs defining slots therebetween;

a thermally conductive and electrically non-conductive embedding material substantially filling the slots; and,

an electrical heating resistor disposed along the slots in the embedding material, the resistor having at least one slightly undulating double-curved wire of a form comparable to a substantially stretched-out helix, the curved portions of the resistor effectively preventing distortion of the resistor due to thermal stresses during operation, whereby reduced weight and reduced thermal capacities substantially increase operational efficiency without substantial risk of electrical short circuits between the hotplate body and the heating resistor.

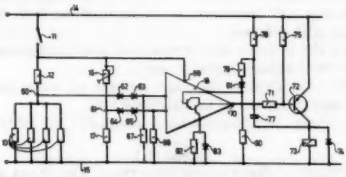


4,504,732

SIMULATIVE TEMPERATURE CONTROLLER FOR A MOTOR VEHICLE

Carsten Bube, Ludwigsburg; Gerd Thiele, Stuttgart, and Hans Zeller, Grafenau, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Continuation of Ser. No. 350,548, Feb. 19, 1982, , which is a continuation of Ser. No. 128,765, Mar. 10, 1980, Pat. No. 4,348,583, which is a continuation of Ser. No. 898,758, Apr. 20, 1978, abandoned. This application Jun. 16, 1984, Ser. No. 570,441
Claims priority, application Fed. Rep. of Germany, Jun. 11, 1977, 2726458
Int. Cl.³ H05B 1/02
U.S. Cl. 219—497 7 Claims



1. A control apparatus in a motor vehicle, comprising an electrically heated device;

a temperature simulating means having a resistor element connected in series with said device and an RC element connected in parallel with said device for generating a continuous simulated temperature signal over the course of the entire heating and cooling-down phase of said device and corresponding to variations in the actual temperature of said device as a result of a flow of electric current through said device;

a D.C. power supply means for supplying current to said device and said temperature simulating means;

a threshold switch for affecting the switching state of said heating device, connected to receive said simulated temperature signal, for generating a first output signal whenever the simulated output temperature signal exceeds a first predetermined value and for generating a second output signal whenever the simulated temperature signal falls below a second predetermined value; and

current flow interrupting means, which is activated by said threshold switch output signal to intermittingly interrupt the flow of current to said device and said temperature

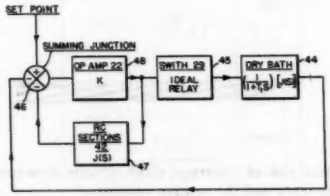
simulation means from said electric power supply means, whereby said device is switched on an off in a closed-loop control in accordance with the temperature of said device.

4,504,733

DRY BATH TEMPERATURE CONTROL

William J. Walsh, Dubuque, Iowa, assignor to Sybron Corporation, Rochester, N.Y.

Filed May 15, 1984, Ser. No. 610,447
Int. Cl.³ H05B *3/06*
U.S. Cl. 219—521 **16 Claims**



1. The method of controlling a thermal load as if it were a thermal mass having a single time constant, comprising the steps of

(a) providing said load in the form of a block, said block incorporating one or more receptacles for an object or objects to be heated and having a temperature sensor and electrical resistance heating means for heating said block;

(b) sensing an actual temperature at some position in said block by locating said sensor in close thermal association with said block at said position for providing a signal representing said actual temperature and determining the relationship between said actual temperature and a desired temperature of said block;

(c) connecting and disconnecting said heating means to and from a source of electrical current, depending on said relationship, for causing heat to be transferred from said heating means to said position in block in accordance with the transfer function $1/(1+T_1S)$ by modifying such connecting and disconnecting in accordance with the function J(S), wherein

T_1=the primary time constant of said thermal load,

S=the Laplace operator, and

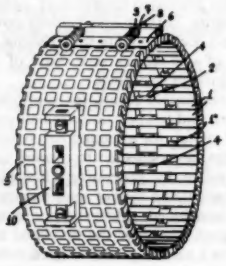
J(S)=the transfer function for one or more secondary time constants of said thermal load.

4,504,734

ELECTRIC RESISTANCE HEATING ASSEMBLY FOR PLASTICS MATERIAL EXTRUDERS

Gaetano Piazzola, Viale Borri, 148, 21100 Varese, Italy

Filed Nov. 9, 1983, Ser. No. 550,295
Claims priority, application Italy, Nov. 12, 1982, 23452/82[U]
Int. Cl.³ H05B *3/02*
U.S. Cl. 219—550 **3 Claims**



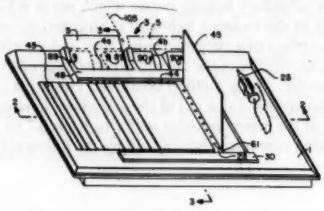
1. An electric resistance heating assembly, characterized in that it comprises a plurality of ceramics material strips wound as a ring and coiled wire electric resistances (3), passing through at least two holes as transversely formed in said ceramics material strips (1), means for coupling said strips to one another in a partial sliding relationship, along the longitudinal axes thereof, said strips having at least two different lengths, in such a way as to provide an interconnected structure, having void zones, said ceramics material strips having a substantially square cross-section and being provided with two opposite walls (1', 1''), having respectively a concave and convex configuration, whereat there are formed evenly spaced through holes (2).

4,504,735

DUAL THROAT DATA REGISTERING APPARATUS AND CARD THEREFOR

Stephen W. Thayne, San Anselmo, Calif., assignor to Computer Election Systems, Berkeley, Calif.

Filed May 17, 1983, Ser. No. 495,266
Int. Cl.³ G07C *13/00*
U.S. Cl. 235—50 A **16 Claims**



1. A data registering apparatus for registering data on a data processable record card, comprising:

a base;

first and second templates positionable adjacent to one another;

a third template positionable above said first and second templates;

said third template provided with apertures adapted to register with corresponding apertures in said first template and with a first set of index point areas of said record card when said card is positioned in a first superposed operative position relative to said first and third templates;

said third template provided with additional apertures adapted to register with corresponding apertures in said second template and with a second set of index point areas of said record card when said card is positioned in a second superposed operative position relative to said second and third templates;

means for mounting said templates together in a normal position with the apertures of said third template offset from the corresponding apertures of said first and second templates;

means for shifting said third template relative to said first and second templates to bring said templates and said record card into said first or second operative position; and

positioning means for locating said record card in said first operative position or said second operative position.

4,504,736

GAMMA RAY SPECTRAL TOOL FOR BOREHOLE USE

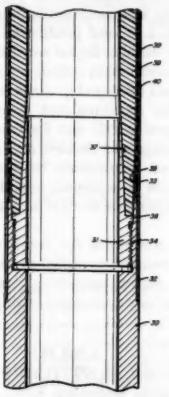
Harry D. Smith, Jr.; Tony M. Small, both of Houston, and John G. Deaton, Brookshire, all of Tex., assignors to Halliburton Company, Duncan, Okla.

Filed Jun. 16, 1982, Ser. No. 388,844
Int. Cl.³ G01V *5/04*
U.S. Cl. 250—256 **6 Claims**

1. A well logging tool sized and adapted for passage through

a well borehole for use in detecting naturally occurring gamma rays, said logging tool comprising:

at least one pair of threadedly interconnecting tubular members, said tubular members when interconnected defining a frusto-conical recess, a tubular composite low atomic number member having at least one end with a complementarily shaped frusto-conical end for tight reception in said recess,



a tubular elastomeric sealing member enclosing said low atomic number member;

wear resistant outer means enclosing said sealing member for protecting said sealing member from abrasion with the borehole; and

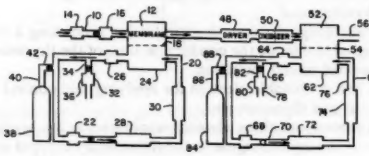
means disposed within said low atomic number member for detecting gamma rays and separating them into an energy spectrum.

4,504,737

TRITIUM MONITOR WITH IMPROVED GAMMA-RAY DISCRIMINATION

Samson A. Cox; Edgar F. Bennett, both of Downers Grove, and Thomas J. Yule, West Chicago, all of Ill., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Oct. 21, 1982, Ser. No. 435,795
Int. Cl.³ G01N *21/00, 23/00*
U.S. Cl. 250—435 **12 Claims**



1. Apparatus for providing a selective measurement of any tritium oxide in a radioactive sample gas which may contain tritium and be contaminated with at least one other radioactive component and wherein said apparatus may be exposed to gamma radiation, comprising

first sample gas means including means for providing a sample gas,

first counting gas means including a counting gas,

first tritium oxide separation means interposed between the sample gas means and the counting gas means for selectively separating at least a portion of any tritium oxide from the sample gas into the counting gas,

pulse generating means radioactively coupled to the counting gas means and responsive to radioactivity therein for generating a series of electrical pulses including pulses having energies below about 20 keV and individually representative by the rise time of any tritium oxide, gamma radiation, or said contaminating radioactive component,

rise time discrimination means for separating pulses having energies below about 20 keV and with rise times below a value representing a general upper limit for tritium oxide from pulses with rise times above said value, and

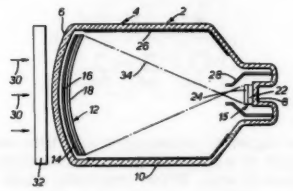
means for counting the pulses with rise times below said value as representative of the tritium oxide content of the sample gas.

4,504,738

INPUT SCREEN FOR AN IMAGE INTENSIFIER TUBE AND A METHOD OF MAKING THE SAME

Takashi Noji, Odawara; Yoshiharu Obata, Yokohama, and Takayoshi Higashi, Chigasaki, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Japan

Filed Dec. 3, 1982, Ser. No. 446,618
Claims priority, application Japan, Dec. 26, 1981, 56-213004
Int. Cl.³ G01T *1/16*
U.S. Cl. 250—483.1 **12 Claims**



1. An input screen for an image intensifier tube comprising:

a substrate consisting of a plurality of crystal grains of aluminum or aluminum alloy arranged in a plane so that said crystal grains have non-directional shapes in said plane; and

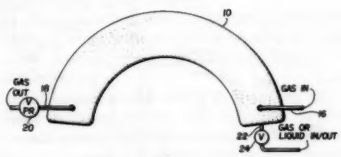
a phosphor layer vapor deposited on said crystal grains of said substrate.

4,504,739

METHODS OF FILLING AND EMPTYING RADIATION SHIELDS

John A. Weissenfluh, 13212 Ridge Dr., Rockville, Md.

Continuation of Ser. No. 140,527, Apr. 15, 1980, Pat. No. 4,362,948. This application Sep. 28, 1981, Ser. No. 306,057
Int. Cl.³ G21F *3/00*
U.S. Cl. 250—519.1 **7 Claims**



1. A method of filling a radiation shield comprising a free-standing container formed of thin flexible material, said method comprising the steps of:

first, filling the radiation shield operable to be free-standing with a gas at sufficient pressure to form the shield into its designed dimensional free-standing configuration; then

second, placing the radiation shield in the desired relationship to a radiation source; and then

third, replacing the gas with a radiation attenuating liquid which also forms the shield into its designed dimensional free-standing configuration.

4,504,740

ARRANGEMENT WITH LIGHT-SENSITIVE COMPONENTS

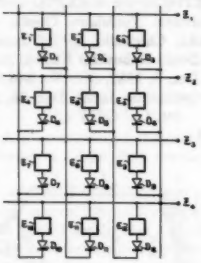
Klaus Gillessen, Untergruppenbach; Peter Mischel, Heilbronn, both of Fed. Rep. of Germany, and Christopher Malinowski, Bridgewater, N.J., assignors to Telefunken Electronic GmbH, Heilbronn, Fed. Rep. of Germany

Filed Oct. 22, 1985, Ser. No. 436,025

Claims priority, application Fed. Rep. of Germany, Oct. 23, 1981, 3142043

Int. Cl.³ H01J *40/14*

U.S. Cl. 250—578 **5 Claims**



1. An arrangement comprising several light-sensitive components, each of which having a rectifying component connected thereto in series, further comprising a lead matrix with column leads and line leads, with the mth line lead connected directly to the mth column lead and to the reamining column leads through one series connection, respectively, consisting of a light-sensitive component and a rectifying component, and with external contacts attached to the line leads or column leads.

4,504,741

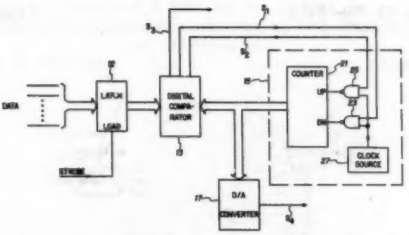
DIGITAL CIRCUIT FOR GENERATING ASCENDING OR DESCENDING RAMP-LIKE WAVEFORMS

Scott T. Armitage, Minnetonka, Minn., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Aug. 30, 1982, Ser. No. 413,094

Int. Cl.³ H03K *4/06, 4/02, 21/10*

U.S. Cl. 307—228 **3 Claims**



1. Digital apparatus for generating ramp-like waveforms comprising:

memory first means for receiving digital data input to the waveform generating apparatus and, in response thereto, providing as output a reference digital word,

second means for generating and providing as output a variable digital word, said second means being controllable so that said variable digital word may change ascendingly, descendingly, or not at all, said second means comprising a source of constant frequency clock signals and an up-down counter means for providing said variable digital word, the counter means output incrementing a predetermined number of bits per clock signal while a first predetermined relationship exists between the variable digital word and the reference word, the counter means output decrementing a predetermined number of bits per clock signal while a second predetermined relationship exists between the variable digital word and the reference word, and the counter means output not changing while a third predetermined relationship exists between the two words,

third means for receiving and testing said reference and variable digital words and for commanding said second means to change said variable digital word until said third predetermined relationship between said reference and variable words is achieved, and then to cease changing until a new reference word is provided by said first means, and

fourth means connected for receiving the second means output and comprising digital to analog converter means, said fourth means outputting ramp-like waveforms in response to changes in said variable digital word.

4,504,742

ELECTRICAL SWITCHING DEVICE

Beresford C. Joseph, Doncaster East, Australia, assignor to Middendorp Electric Co. Pty. Ltd., West Melbourne, Australia

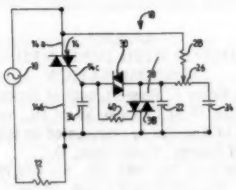
PCT No. PCT/AU81/00103, § 371 Date Apr. 5, 1982, § 102(e) Date Apr. 5, 1982, PCT Pub. No. WO82/00549, PCT Pub. Date Feb. 18, 1982

PCT Filed Aug. 4, 1981, Ser. No. 371,292

Claims priority, application Australia, Aug. 4, 1980, PE4860

Int. Cl.³ H03K *17/72*

U.S. Cl. 307—252 N **9 Claims**



1. An electrical switching device comprising

a thyristor; and

a control signal generating circuit for generating a control signal to change the conduction state of the thyristor, said control circuit including

a first switchable element for applying said control signal to said thyristor; and

a second switching element responsive to the application of the control signal to the thyristor by the first switchable element for substantially removing the control signal from the thyristor after its conduction state has been changed by the control signal.

4,504,743

SEMICONDUCTOR RESISTOR ELEMENT

Keizo Aoyama, Yamato, and Takahiko Yamauchi, Kawasaki, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Nov. 30, 1981, Ser. No. 326,125

Int. Cl.³ H03K *3/26, 3/01*

U.S. Cl. 307—310 **1 Claim**

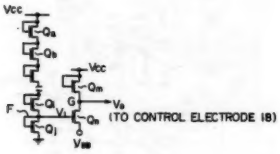
1. A semiconductor resistor element operatively connected to receive a control voltage, said resistor element comprising: wirings being formed at both ends of a polycrystalline semi-

conductor film which is formed in a desired topological shape;

a control electrode, being provided on said polycrystalline semiconductor film between said two ends via an insulating film, operatively connected to receive said control voltage for controlling the resistance of said polycrystalline semiconductor film; and

a circuit for generating said control voltage including

MOS transistor Q_a through Q_j connected between a power supply and ground, the respective drains and gates being short-circuited, and



transistors Q_m and Q_n connected in series between a positive power supply and a gegative power suppy, the transistors Q_a through Q_j have nearly the same mutual conductance, the transistor Q_j has a small mutual conductance, the transistor Q_m serves as a resistor with its drain and gate being short-circuited, the transistor Q_n receives a voltage from a point at which the transistors Q_i and Q_j are connected together, and said control voltage is otained from a point at which the transistors Q_m and Q_n are connected together.

4,504,744

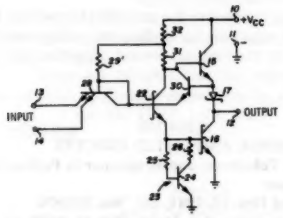
SCHOTTKY TTL INTEGRATED LOGIC GATE CIRCUIT WITH REDUCED SPEED POWER PRODUCT

Ramanatha V. Balakrishnan, San Jose, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Jan. 13, 1983, Ser. No. 457,779

Int. Cl.[3] **H03K** *19/013, 19/088*

U.S. Cl. 307—456 **16 Claims**



1. A low power inverter gate circuit having input and output terminals wherein said output terminal provides an inverted logic state representation of the input terminal logic state, said circuit comprising;

first and second supply rails connectable to a source of operating power;

current source transistor means coupled between said first supply rail and said output terminal and having a control terminal;

current sink transistor means coupled between said second supply rail and said output terminal and having a control terminal;

phase splitter transistor means having a control terminal, a first output coupled to said control terminal of said current source transistor means, and a second output coupled to said control terminal of said current sink transistor means;

diode means coupled between said input terminal and said control terminal of said phase splitter transistor means; and

active transistor means having a control terminal coupled to said output terminal and controlled terminals coupled between said control terminal of said phase splitter transistor means and said control terminal of said current source transistor means.

4,504,745

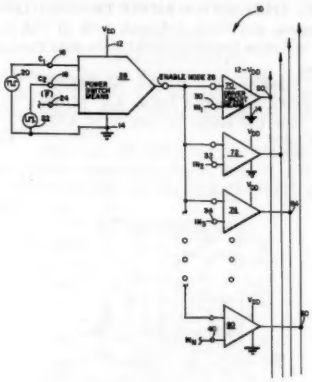
CLOCKED TRI-STATE DRIVER CIRCUIT

John R. Spence, Villa Park, and Michael M. Yamamura, Cupertino, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Jun. 14, 1982, Ser. No. 388,044

Int. Cl.[3] **H03K** *19/096, 17/693*

U.S. Cl. 307—473 **12 Claims**



1. A clocked tri-state driver circuit characterized by being operable between a voltage source and a reference potential, such as ground, and having

a first clock node; and

a second clock mode, said first and second clock nodes for receiving first and second clock signals from respectively first and second clock signal sources, said first clock signal being periodic and having a first and second logic level, said second clock signal being the complement of said first clock signal,

a float node for receiving a complement float signal ($\overline{F}$) having a first and second logic level from a float signal source,

an array of input nodes, each input node for receiving an input signal having a first and second logic level from a respective input signal source,

an array of output nodes, each output node corresponding to a respective input node and being coupled to a respective load, said clocked tri-state driver comprising:

an enable node,

a clocked power switch means powered by said voltage source with respect to said reference potential and coupled to said first and second clock nodes and said float node, said clocked power switch means being responsive to said first and second clock signal and said complement float signal first logic level for providing a clocked enable signal to said enable node,

an array of driver circuit means for conditioning and transferring each respective input signal from a corresponding input node as an output signal to a corresponding output node when enabled,

each respective driver circuit means being powered by said voltage source with respect to said reference potential and

coupled to said enable node and enabled by said clocked enable signal,

each respective driver circuit means being decoupled from said corresponding output node when not enabled, whereby, said tri-state driver circuit operates to provide an array of output signals to an array of corresponding output nodes when enabled by said clocked enable signal first logic level at said enable node, said tri-state driver circuit also operating to decouple said output signals from said corresponding output nodes in response to said clocked enable signal second logic level thereby permitting said corresponding output nodes to be conditioned by voltage sources other than said tri-state driver circuit.

4,504,746

SEMICONDUCTOR BUFFER CIRCUIT USING ENHANCEMENT-MODE, DEPLETION-MODE AND ZERO THRESHOLD MODE TRANSISTORS

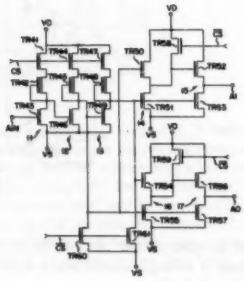
Makoto Segawa, and Shoji Arilzumi, both of Tokyo, Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Apr. 6, 1982, Ser. No. 365,897

Claims priority, application Japan, Apr. 16, 1981, 56-57573

Int. Cl.³ H03K *19/096;* **G11C** *8/00*

U.S. Cl. 307—475 **10 Claims**



1. A semiconductor circuit with a buffer circuit, said buffer circuit including:

first and second input terminals to which are supplied input signals of opposite phases;

first and second power source terminals and a control terminal;

first and second MOS transistor means whose current paths are connected between said second power source terminal and said first and second input terminals;

third and fourth MOS transistor means whose gates are respectively connected to said first and second input terminals, and whose current paths are connected in series with each other between said first and second power source terminals, said third MOS transistor means having a threshold voltage of substantially 0 V;

fifth MOS transistor means whose gate is connected to a junction of said third and fourth MOS transistor means, and which has a threshold voltage of substantially 0 V;

sixth MOS transistor means whose gate is connected to the gate of said fourth MOS transistor means, and whose current path is connected at one end to said second power source terminal and at the other end to said first power source terminal through the current path of said fifth MOS transistor means;

an output terminal connected to the junction of said fifth and sixth MOS transistor means; and

switching means connected to said fifth MOS transistor means and whose conduction state is controlled in response to a control signal supplied to said control terminal.

4,504,747

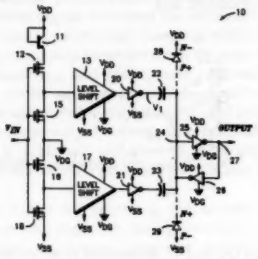
INPUT BUFFER CIRCUIT FOR RECEIVING MULTIPLE LEVEL INPUT VOLTAGES

Michael D. Smith, Austin, Tex.; Andrew S. Olesin, Maynard, Mass., and Roger A. Whatley, Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Nov. 10, 1983, Ser. No. 550,671

Int. Cl.³ H03K *19/092, 19/094*

U.S. Cl. 307—475 **11 Claims**



1. An input buffer circuit for receiving multiple level input voltages comprising:

a first inverter having an input for receiving an input voltage which has an amplitude which varies by one of a plurality of levels, and an output;

a second inverter coupled to the first inverter and having an input for receiving the input voltage, and an output;

voltage level shifting means having a first input coupled to the output of the first inverter, a second input connected to the output of the second inverter, and first and second outputs for buffering and shifting the input voltage a predetermined amount;

a first capacitor having a first electrode coupled to the first output of the voltage level shifting means, and a second electrode;

a second capacitor having a first electrode coupled to the second output of the voltage level shifting means, and a second electrode; and

latching means coupled to the second electrodes of the first and second capacitors for latching the voltage level due to the charge on the first and second capacitors and providing an output.

4,504,748

SENSE AMPLIFIER CIRCUIT

Atsushi Oritani, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Oct. 13, 1981, Ser. No. 310,976

Claims priority, application Japan, Oct. 15, 1980, 55-144162

Int. Cl.³ H03K *5/24, 3/023, 3/356;* **G11C** *7/06*

U.S. Cl. 307—530 **13 Claims**

1. A sense amplifier circuit comprising:

power supplying means, including first and second means for providing first and second potentials, respectively;

first and second input lines;

first and second output lines;

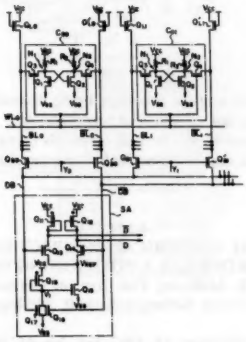
differential amplifier means, operatively connected to said first means of said power supplying means, to said first and second input lines, and to said first and second output lines, for sensing and amplifying the difference in potential between said first and second input lines and for generating bipolar signals, in response to the difference in potential between said first and second input lines, on said output lines;

first pull-down circuit means, operatively connected to said differential amplifier means, forming a connection node therebetween, and to said second means of said power

supplying means, for establishing a reference potential for said differential amplifier means; and

compensation circuit means, operatively connected to said first and second means of said power supplying means, to said first pull-down circuit means, and to said input lines, for detecting the out-of-phase component of the potentials on said input lines so as to control the conductance of said first pull-down circuit means, said compensation circuit means comprising:

a first load transistor operatively connected to said first



means of said power supplying means and to said first pull-down circuit means; and

first and second transistors, each having a drain operatively connected to said first load transistor, a gate operatively connected to one of said input lines and a source operatively connected to said second means of said power supplying means, the sources of said first and second transistors being connected to said second means of said power supplying means independently of the connection node between said differential amplifier means and said first pull-down circuit means.

4,504,749

DELAY PULSE GENERATING CIRCUIT

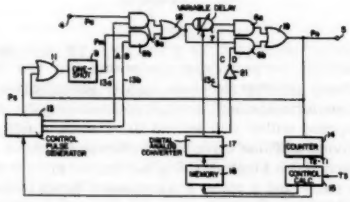
Kenji Yoshida, Saitama, Japan, assignor to Takeda Riken Co., Ltd., Tokyo, Japan

Filed Jul. 20, 1982, Ser. No. 400,036

Claims priority, application Japan, Jul. 20, 1981, 56-113224

Int. Cl.³ H03K *5/13, 5/159*

U.S. Cl. 307—590 **18 Claims**



1. A delay circuit for transmitting a pulse with a selectable delay between input and output terminals thereof, said circuit comprising

a signal line connecting between said input and output terminals, along which the pulses to be delayed are transmitted,

a delay unit connected in said signal line, the delay time of said delay unit being variable to provide said selectable delay between said input and output terminals,

a bypass line connected in parallel with a portion of said signal line which includes said delay unit, to selectively allow pulses provided to said signal line to bypass said portion of said delay line including said delay element,

feedback means for feeding back pulses corresponding to pulses at said output terminal to said signal line at a point that is no further along said signal line than the input to said portion of said signal line

switching means for switching the feedback pulses between said portion of said signal path and said bypass line, for transmitting the feedback pulses to said output terminal,

operating means for controlling said feedback means and switching means, and for adjusting said delay time of said delay unit, wherein said selected delay is provided based on comparison of the periods for repeated transmission of respective pulses from said output terminal via said feedback means and along each of said portion of said signal line and said bypass line.

4,504,750

LINEAR MOTOR

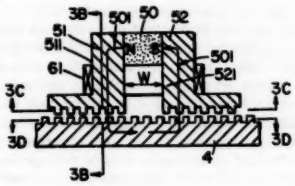
Hiromi Onodera; Noriaki Wakabayashi, both of Hirakata; Kiichiro Yamada, Ibaraki, and Yasushi Sugizaki, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Apr. 20, 1983, Ser. No. 486,965

Claims priority, application Japan, Apr. 21, 1982, 57-67575; Jul. 23, 1982, 57-129338; Jul. 26, 1982, 57-130672; Jul. 29, 1982, 57-133432

Int. Cl.³ H02K *33/02*

U.S. Cl. 310—12 **11 Claims**



1. A linear motor comprising:

a stationary guiding member extending in a longitudinal direction and having a plurality of transversely spaced rows of teeth of magnetic material, said teeth being at a constant pitch P in said longitudinal direction; and

a movable element in spaced opposed relation to said guiding member with a small gap between said movable element and said guiding member, and said movable element being movable along said guiding member;

said movable member having:

a pair of iron cores spaced from each other in said longitudinal direction;

means connected between said iron cores for supplying bias magnetic flux to said pair of iron cores; and

means electrically associated with said iron cores for energizing said pair of iron cores;

each of said pair of iron cores having a plurality of field cores respectively facing corresponding rows of said plurality of transversely spaced rows of teeth on said guiding member, each of said field cores having teeth on the surface facing said guiding member spaced in said longitudinal direction at the same pitch P as that of said teeth in said rows on said guiding member, said teeth on each of said plurality of field cores on each of said pair of iron cores being aligned in a direction transverse to said guiding member with the teeth on the other field cores on the iron core, and the teeth on the field cores on one of the pair of iron cores being offset from the teeth on the field cores of the other of said pair of iron cores by a distance of $\frac{1}{4}P$ in said longitudinal direction; and

said teeth in each of said plurality of rows of teeth on said guiding member being offset in the longitudinal direction a distance n/m·P from the teeth in adjacent rows, m being the number of phases of said linear motor and n being an integer, and m>n.

4,504,751

FAN WITH ELECTRONICALLY COMMUTATED DIRECT-CURRENT MOTOR

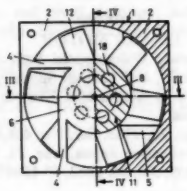
Peter Meier, Lindau, Switzerland, assignor to Micronel AG, Tagelswangen, Switzerland

Filed Dec. 7, 1983, Ser. No. 559,190

Claims priority, application Switzerland, Dec. 10, 1982, 7219/82

Int. Cl.³ H02K 9/06

U.S. Cl. 310—62 **11 Claims**



1. A fan with an electronically commutated direct-current motor, said motor having a stator and a blade-equipped rotor, said rotor being provided with an odd number of diametrically opposed pairs of permanent magnets, wherein each of said pairs comprises two permanent magnets with unlike poles, the individual permanent magnets of the rotor being separated one from each other in a circumferential arrangement, and whereby successive poles along the circumference are unlike, and said stator being provided with two coils that are excited by an electronic control circuit and with a Hall element that senses the magnetic field of the rotor's permanent magnets as they pass by and generates a control voltage for the control circuit, and the two coils being positioned diametrically on the stator and the Hall element being positioned circumferentially between the two coils, wherein the stator has a magnetic return-path associated with the coils, said magnetic return-path of the stator being a flux-conduction plate which extends diametrically and whose angular position is shifted in relation to that of the coils by a fraction or by a multiple of a fraction of the angular spacing between two circumferentially successive permanent magnets of the rotor.

4,504,752

ONE PIECE MOLDED VOLTAGE REGULATOR AND BRUSH HOLDER UNIT

Yoshiyuki Iwaki, Himeji; Hideo Imori, Hyogo, and Hitoshi Gotou, Himeji, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 30, 1983, Ser. No. 556,600

Claims priority, application Japan, Nov. 30, 1982, 57-182817[U]

Int. Cl.³ H02K 13/00

U.S. Cl. 310—68 R **1 Claim**

1. A one piece molded voltage regulator and brush holder unit comprising:

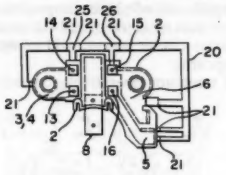
(a) a one piece resin-molded body;

(b) a flat, square electronic voltage regulator embedded in said one piece resin-molded body with four lead wires projecting from the four corners of said electronic voltage regulator into said one piece molded body;

(c) four terminals embedded in said one piece resin-molded body except for a small exposed part on each of said terminals, said terminals being embedded between a pair of recesses for holding brushes;

(d) a brush disposed in each of said recesses, each of said brushes being connected to one of said lead wires which is also connected to a corresponding one of said terminals;

(e) each of said four lead wires which project from said



electronic voltage regulator being connected to a corresponding one of said four terminals; and

(f) the exposed parts of said terminals being shaped so that they face said recesses for holding brushes.

4,504,753

BIAXIAL ELECTRICAL COMPACT DRIVE, IN PARTICULAR A POSITIONING DRIVE

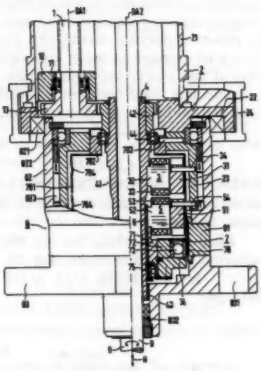
Dietmar Koch, Mülheim, Fed. Rep. of Germany, assignor to Kraftwerk Union Aktiengesellschaft, Mülheim, Fed. Rep. of Germany

Filed Sep. 13, 1982, Ser. No. 417,064

Claims priority, application Fed. Rep. of Germany, Sep. 17, 1981, 3137101

Int. Cl.³ H02K 7/10

U.S. Cl. 310—75 R **8 Claims**



1. Electrical compact drive comprising first and second independently drivable drive shafts, said second drive shaft being in the form of a hollow shaft and said first drive shaft being disposed within said second drive shaft, a first drive motor driving said first drive shaft and having a stator and a rotor, a second drive motor driving said second drive shaft and having a stator and a rotor, a transmission being connected between said second drive motor and said second drive shaft and having an outer output element and an inner drive element being coupled with the rotor of said second drive motor and being coaxial with said outer output element, said stators of said first and second drive motors, said outer output element of said transmission and said second drive shaft being rigidly coupled together for obtaining synchronism, and a fixed internally toothed outer ring, said transmission being a tension wave transmission, said inner drive element of said transmission being in the form of a tension wave generator, and said outer output element being in the form of an externally toothed

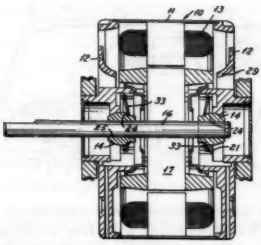
elastic tensioning wheel in engagement with said fixed internally toothed outer ring.

4,504,754

ELECTRIC MOTOR

Thomas W. Stone, Owosso, Mich., assignor to Universal Electric Company, Owosso, Mich.

Filed Sep. 28, 1982, Ser. No. 425,415
Int. Cl.³ H02K *5/16*
U.S. Cl. 310—90 **6 Claims**



1. An electric motor comprising
a casing,
a stator mounted in said casing,
a rotor,
and end members rotatably mounting said rotor with respect to said stator,
at least one of said end members being cast and comprising an integral hub having a plurality of radially inwardly extending portions defining a bearing seat,
a plurality of axially extending ribs on the inner surface of said hub,
said ribs having slots machined therein defining a surface in each rib that is accurately spaced axially with respect to the seat,
and a substantially flat spring member having a solid annular peripheral portion engaging said surfaces,
said spring member having a plurality of fingers extending radially inwardly from said annular peripheral portion and having free ends engaging said bearing,
said annular peripheral portion having notches in the periphery thereof whereby said spring is placed in position with the notches aligned with said ribs and rotated to cause said annular peripheral portion to engage said surfaces of said ribs.

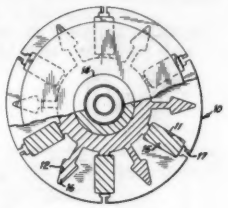
4,504,755

ROTOR RELUCTANCE NOTCH FOR COGGING CONTROL

Burley C. Semones, Radford, and Leon G. Reiss, Dublin, both of Va., assignors to Kollmorgen Technologies Corporation, Dallas, Tex.

Filed Nov. 3, 1983, Ser. No. 548,333
Int. Cl.³ H02K *21/12*
U.S. Cl. 310—156 **4 Claims**

1. A rotor for an electric motor having a stator with substantially straight slots comprising:
(a) a cylindrical stack of substantially circular ferrous laminations having,
(i) at least a first set of axial openings; and
(ii) a plurality of reluctance notches skewed with respect to the axis of the cylindrical stack and the substantially straight stator slots, the skewed reluctance notches being cut into outer periphery of said laminations and communicating with the first set of axial openings; and
(b) a plurality of permanent rare earth magnets disposed in the first set of axial openings and cooperating with the skewed reluctance notches to provide a non-axial mag-



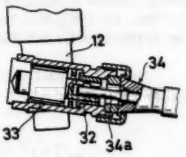
netic flux on the surface of the rotor for controlling cogging torque.

4,504,756

ELECTRICAL SPEED SENSOR

Hiroyuki Amano, and Naoji Sakakibara, both of Aichi, Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Oct. 30, 1979, Ser. No. 89,665
Claims priority, application Japan, Nov. 28, 1978, 53-164018[U]
Int. Cl.³ H02K *19/20*
U.S. Cl. 310—168 **3 Claims**



1. In an electrical speed sensor of the type for generating an electrical signal proportional to the rotational speed of a vehicle wheel comprising a casing, a first shaft rotatable within said casing, magnetic rotor means driven by said first shaft, magnetic circuit means secured to said casing and associated with said magnetic rotor means and an electrical coil associated with said magnetic circuit means, the improvement comprising a second shaft rotatably mounted in said casing with the axis thereof disposed at a fixed acute angle relative to the axis of said first shaft, means rotatably interconnecting said second shaft to said first shaft and means at one end of said second shaft adapted to be connected to a speedometer cable.

4,504,757

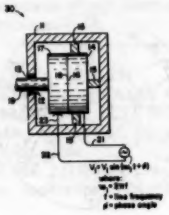
CONTACT-CHARGE MOTOR AND GENERATOR

James P. Spratt, Rancho Palos Verdes, Calif., assignor to Science Applications, Inc., La Jolla, Calif.

Filed Aug. 18, 1982, Ser. No. 409,100
Int. Cl.³ H02N *1/00*
U.S. Cl. 310—308 **9 Claims**

1. In an electro-mechanical device for converting mechanical energy into electrical energy and vice versa, the combination comprising a first member formed from a metallic material, and a second member formed from a semiconductor material and having a surface in abutting electrical contact with a surface of said first member, said surface of said second mem-

ber being divided into a plurality of segments such that relative movement between said members in a direction along the plane



defined by said abutting surfaces causes the capacitance of said device to vary within predetermined limits.

4,504,758

SURFACE ACOUSTIC WAVE DEVICES HAVING FREQUENCY RESPONSE THAT CAN BE ADJUSTED

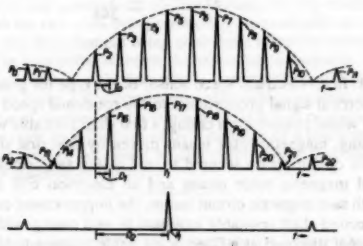
Philip H. Wisbey, Colchester, England, assignor to The Marconi Company Limited, Stanmore, England

Filed Mar. 18, 1983, Ser. No. 476,602

Claims priority, application United Kingdom, Mar. 31, 1982, 8209558

Int. Cl.³ H03H *9/25*

U.S. Cl. 310—313 R **11 Claims**



1. A surface acoustic wave device comprising:

a first transducer having means for providing a plurality of efficiency peaks at a first set of different frequency values;

a second transducer having means for providing a plurality of efficiency peaks at a second set of different frequency values;

means for transmitting surface acoustic waves along a surface between said first and second transducers;

means for influencing the velocity of the waves in at least a region of the first transducer so as to displace the first set of frequency values relative to the second set, said means for influencing the velocity including means for making one of the frequency values of the first set substantially coincide with one of the frequency values of the second set so that the device has a good frequency response at that frequency value, and other frequency values of the first set do not coincide with frequency values of the second set so that the device does not have a good frequency response at said other values.

4,504,759

SAW DEVICE WITH SPECIAL LENGTH-WEIGHTED INTERDIGITAL ELECTRODE ARRAY

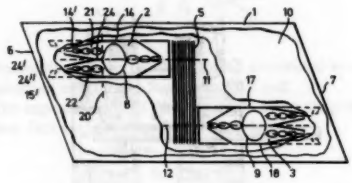
John Schofield, Coulsdon, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 5, 1983, Ser. No. 558,407

Claims priority, application United Kingdom, Dec. 22, 1982, 8236366

Int. Cl.³ H03H *9/25*

U.S. Cl. 310—313 C **6 Claims**



1. A surface acoustic wave device comprising, a piezoelectric substrate for propagating a surface acoustic wave at a surface thereof, and transducer means for launching or receiving surface acoustic wave energy propagating along a predetermined propagation direction at said surface, said transducer means comprising a length-weighted interdigital electrode array arranged to provide along a propagation path therethrough the effect of a sequence of weighted taps having weighting factors which conform to an envelope of values having a main lobe and at least one pair of minor lobes disposed respectively before and after the main lobe, wherein at least some of the taps having smaller weighting factors each comprise the overlapping portions of a plurality of similar pairs of adjacent electrodes electrically connected in series so as to transduce the same phase of a surface acoustic wavefront propagating along said propagation direction, characterized in that the transducer array is made up of a succession along its length of non-overlapping groups of taps, each group comprising taps each formed by the same respective number of said pairs of electrodes, and the transition from each group to a next adjacent group, whose taps are formed by a different number n of pairs of electrodes which are series-connected when $n > 1$, is arranged substantially to coincide with a corresponding null in the envelope of weighting factor values.

4,504,760

PIEZOELECTRICALLY DRIVEN VIBRATION WAVE MOTOR

Hiroshi Yamamoto, Yokohama; Makoto Katsuma, Kawasaki; Hiroyasu Murakami, Tokyo, and Akira Hiramatsu, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 8, 1983, Ser. No. 559,450

Claims priority, application Japan, Dec. 16, 1982, 57-220842

Int. Cl.³ H01L *41/08*

U.S. Cl. 310—323 **4 Claims**

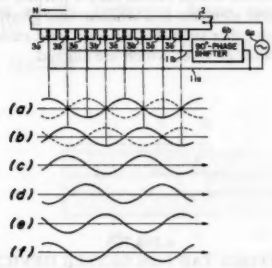
1. A vibration wave motor comprising:

(a) a vibrating member;

(b) a first pair of electro-strain element groups arranged or polarized phase-differentially on one surface of said vibrating member, each group including a plurality of electro-strain elements, wherein a first travelling vibration wave is generated in said vibrating member by application of voltages having a phase difference therebetween to said pair of electro-strain element groups;

(c) a second pair of electro-strain element groups arranged or polarized phase-differentially on the other surface of said vibrating member, said second pair of electro-strain element groups being positioned oppositely to said first pair of electro-strain element groups, each of said second

pair of electro-strain element groups including a plurality of electro-strain elements, wherein a second travelling vibration wave of the same direction as the first travelling vibration wave is generated in said vibrating member by



application of a voltage having a phase difference therebetween to said second pair of electro-strain element groups and

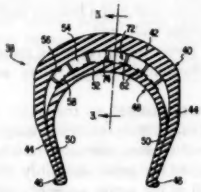
(d) a moving member press-contacted to said vibrating member to be friction-driven thereby.

4,504,761

VEHICULAR MOUNTED PIEZOELECTRIC GENERATOR

Charles G. Triplett, 3154 Reid Dr., Corpus Christi, Tex. 78404

Filed Dec. 28, 1981, Ser. No. 335,256
Int. Cl.³ H01L *41/08*
U.S. Cl. 310—800 **4 Claims**



1. Apparatus for generating electricity comprising

a vehicle having an electrical system including a battery and a plurality of assemblies including a wheel and a tire having a rubberoid casing comprising a first annular band and a second annular band having a plurality of projections thereon juxtaposed to the first band for movement thereto ward in response to rolling movement of the tire; and

means for generating electricity in response to movement of the vehicle along a roadway including

a multiplicity of piezoelectric elements bonded to the first band and juxtaposed to the projections for engagement therewith during rolling movement of the tire for generating electricity in response to rolling movement of the tires relative to the roadway; and

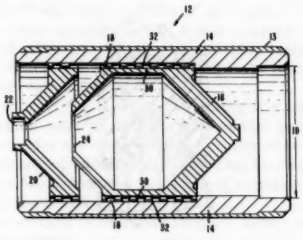
means interconnecting the piezoelectric elements in circuit with the battery for delivering electrical energy generated by the piezoelectric elements to the battery, said means having output wires included.

4,504,762

BUFFER FOR AN ELECTRON BEAM COLLECTOR

Stephen L. Hart, Torrance, and Theodore G. Anderson, II, Rancho Palos Verdes, both of Calif., assignors to Hughes Aircraft Company, El Segundo, Calif.

Filed Jun. 25, 1982, Ser. No. 392,197
Int. Cl.³ H01J *1/02, 25/34, 61/52*
U.S. Cl. 313—30 **6 Claims**



1. A buffer for protecting the electron beam collector of a travelling wave tube,

said collector comprising an elongated tubular wall, an elongated tubular insulating wall of one type of material, an elongated cylindrical electrode of another type of material coaxially positioned within said insulating wall, and said buffer interposed between said electrode and said insulating wall,

said collector further comprising a cylindrical end-piece having a beam entrance aperture which is adapted to receive a beam of electrons, and

said electrode having a corresponding beam entrance aperture,

said buffer comprising:

a continuous web of buffer material capable of being bonded to dissimilar said insulating wall material said electrode material, said web having an alternating pattern of corrugations, the vertices of said corrugations being generally planar and defining two generally parallel, planar surfaces adapted for bonding to said insulating wall and said electrode,

said vertices of said corrugations being offset and nonaligned in adjacent rows so as to prevent the trapping of gases between said planar surfaces and thereby enhance the thermal dissipation capability of said collector, whereby

said continuous web of corrugations permits expansion and contraction of said insulating wall and said electrode by absorbing mechanical stresses, and

said continuous web of corrugations maintains thermal conductivity between said insulating wall and said electrode.

4,504,763

CATHODE RAY TUBE PROVIDED WITH A POTTED BASE

Masayuki Nakanishi, Isezaki; Hirohisa Tsuruzoe, Fukaya; Humiyuki Sato, Fukaya, and Tokuo Hashimoto, Fukaya, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Japan

Filed Aug. 10, 1982, Ser. No. 406,915
Claims priority, application Japan, Aug. 14, 1981, 56-126791
Int. Cl.³ H01J *5/48*
U.S. Cl. 313—318 **2 Claims**

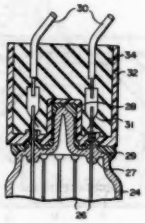
1. A cathode ray tube having a stem mounted at an end of a neck and provided with a potted base, said cathode ray tube comprising:

a plurality of stem pins which extend through said stem mounted at said end of said neck and fixed to said stem;

an insulating housing which is mounted on said stem, said housing at one end including an integral base having holes for receiving said stem pins which extend through said

stem, most of a bottom of said housing comprising said base, and wherein said housing defines an open end opposite to said one end to establish a housing cavity with said integral base;

terminals for connecting (a) leads extending into said housing cavity from the outside through said open end to (b) said stem pins extending into said housing cavity from below through said holes in said base;



an insulating molding material which is filled in said housing cavity and which fixes said stem pins, said leads and said terminals; and

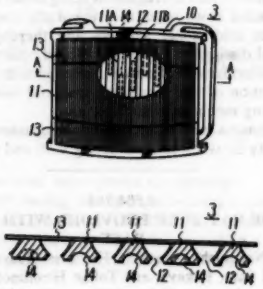
an insulating adhesive for adhering said stem to said bottom of said housing, wherein said insulating adhesive is a different material from said insulating molding material, and wherein said insulating molding material is cured within said housing cavity before said bottom of said housing is adhered to said stem.

4,504,764

CATHODE RAY TUBE WITH COLOR SELECTING GRILL

Yasuhiro Sakamoto, Tokyo; Koji Saita, Yokohama, and Akihiro Kojima, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed May 7, 1982, Ser. No. 376,146
Claims priority, application Japan, May 8, 1981, 56-67269[U]
Int. Cl.³ H01J *29/07, 1/53;* **F16M** *13/00*
U.S. Cl. 313—403 **2 Claims**



1. A cathode ray tube comprising:

(a) a phosphor layer formed on an inner surface of a panel of an envelope;

(b) a colour selecting aperture grill formed of a number of grid elements and located within said envelope opposing to said phosphor layer;

(c) a metal wire extending transversely of said grid element and incontact therewith for coupling together said grid elements;

(d) an electron gun located within said envelope; and

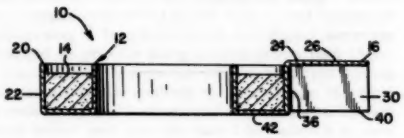
(e) a deflecting means located around said envelope; said cathode ray tube being characterized in that the resonance frequency of at least one grid element of said colour selecting aperture grill is different from that of at least another grid element in the vicinity of said at least one grid element, and said difference in resonant frequency in said grid elements is caused by forming longitudinal grooves in grid elements which extend only a portion of the lengths of said grid elements and wherein said grooves are offset from each other such that adjacent grid elements are not formed with grooves which are aligned.

4,504,765

SUPPORT TAB FOR GETTER DEVICES

Paolo della Porta, Milan, Italy, assignor to SAES Getters SpA, Milan, Italy

Filed May 12, 1982, Ser. No. 377,458
Claims priority, application Italy, May 20, 1981, 21851 A/81
Int. Cl.³ H01J *17/24, 19/70*
U.S. Cl. 313—481 **2 Claims**



1. An improved getter assembly which has a tab when heated by induction resists bending and therefore leaves the getter assembly in its original position; said getter assembly being especially useful when mounted in a cathode ray tube in the antenna position; and getter assembly comprising:

A. a U-shaped holder is the form of an annular ring having an inner-wall an outer wall and a bottom wall joining the inner wall with the outer wall; and

B. an evaporable getter metal releasing material comprising a mixture of a barium-aluminium alloy and nickel in the holder; and

C. a supporting tab attached to the outer wall and integral therewith; said supporting tab comprising:

(1) a quadrilateral element one edge of which is attached to the outer wall of the getter assembly and is integral with the outer wall of the getter assembly; and

(2) a first downwardly extending side wall member attached at its top to the quadrilateral element and integral therewith said side wall member being:

(a) perpendicular to the quadrilateral element; and

(b) having an edge in abutting relationship and substantially perpendicular to the outer wall of the holder; and

(3) a second downwardly extending side wall member attached at its top to the quadrilateral element and integral therewith said side wall member being:

(a) perpendicular to the quadrilateral element; and

(b) having an edge in abutting relationship and substantially perpendicular to the outer wall of the holder; and

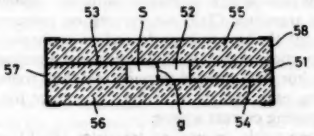
wherein the first side wall member is substantially parallel to the second side wall member;

wherein when the quadrilateral element is heated and tends to bend, the edges of the first and second side wall members contact the outer wall of the getter assembly and inhibit bending of the quadrilateral element leaving the getter assembly in its original position.

4,504,766
CHIP TYPE DISCHARGE ELEMENT WITH LAMINATED INSULATING SHEETS

Toshimi Kaneko, Takefu, Japan, assignor to Murata Manufacturing Co., Ltd., Japan

Filed Aug. 18, 1982, Ser. No. 409,026
Claims priority, application Japan, Aug. 25, 1981, 56-126290[U]
Int. Cl.³ H01J *61/30*; B32B *3/04*
U.S. Cl. 313—634 **6 Claims**

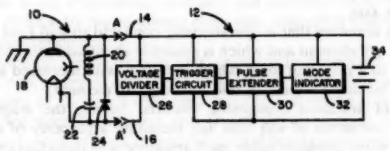


1. A chip-type discharge element, comprising:
a central insulating sheet having a bore therethrough;
first and second insulating sheets sandwiching said central insulating sheet, said first and second insulating sheets being laminated to respective opposing sides of said central insulating sheet to enclose said bore, each of said insulating sheets including opposite first and second lateral sides, said first lateral side of each of said sheets lying in a common first plane, said second lateral side of each of said sheets lying in a common second plane spaced from said first plane;
a first electrode film located on said first insulating sheet and extending from said first lateral side of said first insulating sheet to a position on said first insulating sheet which is located no more than half-way into an area on said first insulating sheet bounded by said bore;
a second electrode film located on said second insulating sheet and extending from said second lateral side of said second insulating sheet to a portion of said insulating sheet located no more than half-way into an area on said second insulating sheet bounded by said bore such that said electrode films do not overlap one another; and
first and second exterior electrode films formed on said first and second lateral sides of said insulating sheets, respectively, and being electrically coupled to said first and second electrode films, respectively.

4,504,767
MAGNETRON MODE DETECTOR

Stephen A. Levie, Burnsville, and William E. Taylor, Golden Valley, both of Minn., assignors to Litton Systems, Inc., Beverly Hills, Calif.

Filed Sep. 7, 1982, Ser. No. 415,627
Int. Cl.³ H05B *37/00*, *41/14*
U.S. Cl. 315—101 **6 Claims**



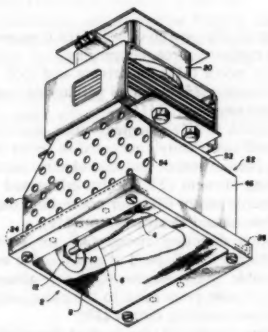
1. Apparatus to detect moding in a microwave oven magnetron comprising:
(a) A voltage divider adapted to be connected to the high voltage anode circuit of a microwave oven magnetron circuit and to provide a low voltage output proportional to transient and steady state conditions of said anode circuit;
(b) a trigger circuit which receives said low voltage output and which provides an electrical output having a pulse-type first output state indicative of the presence of magnetron moding in response to each voltage transient condition substantially exceeding the steady state condition of said anode circuit and a steady second output state indicative of the absence of magnetron moding in response to the steady state condition of said anode circuit;
(c) a pulse extender circuit which receives said trigger circuit electrical output and provides extended electrical output pulses in response to pulse-type occurrences of said first output state; and
(d) an electrical to a visually perceptible signal transducer which receives said extended output pulses and which provides a visible indication of the occurrence and frequency of said magnetron moding by visually indicating the occurrence and frequency of voltage transients in said anode circuit.

4. A method of detecting incipient failure of a microwave oven magnetron tube comprising the steps of:
(1) Providing a visually perceptible output from a microwave oven magnetron circuit indicative of the presence of magnetron moding and by providing a visible discrete output for each anode voltage transient occurring upon the interruption of anode current, both resulting from magnetron moding;
(2) observing said visible discrete output for an increase in the frequency of said visible discrete output; and
(3) determining that an incipient failure exists when said discrete output frequency exceeds a predetermined number of occurrences per unit time of said anode voltage transients.

4,504,768
ELECTRODELESS LAMP USING A SINGLE MAGNETRON AND IMPROVED LAMP ENVELOPE THEREFOR

Michael G. Ury, Bethesda; Charles H. Wood, Rockville, and Patrick J. Ryan, Laurel, all of Md., assignors to Fusion Systems Corporation, Rockville, Md.

Filed Jun. 30, 1982, Ser. No. 393,856
Int. Cl.³ H05B *41/16*, *41/24*
U.S. Cl. 315—248 **1 Claim**



1. A microwave generated plasma lamp for providing electromagnetic radiation, comprising:
a microwave chamber comprised of a reflector means and a mesh member, said microwave chamber having a long dimension which extends in a first direction;
an elongated lamp envelope containing a plasma forming medium disposed in said microwave chamber so as to extend in said first direction;

said reflector means having a pair of coupling slots disposed therein, said coupling slots being disposed approximately equidistant from said chamber ends and from the ends of said envelope, at respective positions nearer to said envelope ends than to the middle of said envelope;

means for generating microwave energy;

means for coupling said generated microwave energy to said coupling slots in said reflector means;

said coupling means including waveguide means comprising a single microwave enclosure defined by a plurality of wall members and having a dimension extending in said first direction, one of said wall members comprising a portion of said reflector means which includes said pair of coupling slots, and said means for generating microwave energy being disposed at an area of said enclosure which is approximately in the center thereof in said first direction and approximately equidistant between said coupling slots in said first direction, and

the frequency of the microwave energy generated by said means for generating microwave energy and the dimension of said microwave chamber in said first direction being such that when said lamp is excited with said microwave energy a standing wave which is symmetrical in said chamber along said first direction and has at least one null exists in said chamber.

4,504,769

ELECTRICALLY-POWERED TOOL

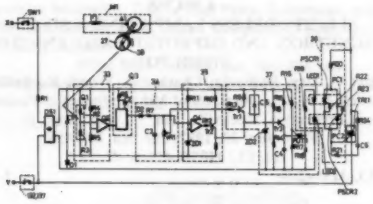
Fusao Fushiya, and Takao Iwatuki, both of Anjo, Japan, assignors to Makita Electric Works, Ltd., Aichi, Japan

Filed Oct. 23, 1981, Ser. No. 314,419

Claims priority, application Japan, Oct. 28, 1980, 55-151689; Dec. 29, 1980, 55-189385[U]

Int. Cl.³ H02P *5/12*

U.S. Cl. 318—345 H **2 Claims**



1. An electrically-powered tool of the type powered from an alternating current source, comprising:

an electric motor (M1) for driving said tool;

a motor housing (15) mounted within said tool for enclosing said electric motor (M1);

a main switch (SW1) mounted within said electrical motor (M1) and electrically connected in series with said alternating current source and said electric motor (M1);

a switching element (TRI1) also connected in series with said electric motor (M1) for controlling the phase of current flow to said electric motor (M1);

a revolution directing circuit (33) for generating pulses proportional to the speed of said electric motor (M1);

a monostable multivibrator (Q3) for generating a fixed length of pulse responsive to the pulse outputs from said revolution detecting circuit (33);

a smoothing circuit (34) for feeding the pulse outputs from said monostable multivibrator (Q3) to a capacitor (C3) and for generating a d.c. voltage proportional to the varying pulse frequency in proportion to the speed of said electric motor (M1);

a first transistor (Tr1) for varying on resistance thereof in inverse proportion to the magnitude of the d.c. output voltage fed from said smoothing circuit (34);

a second transistor (Tr2) for substantially varying on resistance thereof when the magnitude of the d.c. output voltage fed from said smoothing circuit (34) fails below the d.c. output voltage of said electric motor (M1) in an overload condition;

a first and second series circuits in parallel:

said first series circuit including said first transistor (Tr1) and a resistor (R9),

said second series circuit including said second transistor (Tr2) and a resistor (R10);

a capacitor (C5) in parallel with said series circuits and charging only when said main switch (SW1) is turned on, and

a bias resistor (R8) in parallel with said capacitor (C5);

a third transistor (Tr3) for varying on resistance thereof through the base voltage dependent on the voltage dividing portion of said parallel circuit and a resistor (R14);

a capacitor (C4) charged through said third transistor (Tr3) during each half cycle of the a.c. voltage fed from said alternating current source;

a programmable unijunction transistor (PUT1) adapted to conduct when the charged voltage of said capacitor (C4) becomes higher than the gate voltage set by resistors (R16 and R17), thereby developing a discharge voltage from said capacitor (C4); and

a trigger circuit (36) for receiving the output voltage from said programmable unijunction transistor (PUT1) and for generating a trigger signal to the gate terminal of said switching element (TRI1).

4,504,770

ADJUSTING DEVICE FOR ROTARY ANGLE ADJUSTMENT OF A FINAL CONTROL ELEMENT

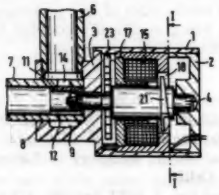
Rainer Burkel, Le Chesnay; René Bayle, Pierrefitte; Jean Denamps, Asnières, and Roger Goussin, Chaville, all of France, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Continuation of Ser. No. 252,754, Apr. 10, 1981, abandoned. This application Dec. 30, 1983, Ser. No. 566,967

Claims priority, application Fed. Rep. of Germany, Apr. 11, 1980, 3013984

Int. Cl.³ G05B *11/01*

U.S. Cl. 318—560 **12 Claims**



1. An adjusting device for rotary angle adjustment on a final control element in a closed—or open—loop control device, which comprises:

an axis;

an armature that is operationally connectd to said final control element and which is rotatable about said axis counter to a restoring force which increases with increased angular displacement of said final control element,

said armature comprising material having the magnetic properties of soft iron and including a plurality of elongated armature poles, each armature pole including an end face;

restoring means providing said restoring force; and

a stationary armature counterpart which comprises material having the magnetic properties of soft iron and which includes a like plurality of elongated magnet poles, each magnet pole including an end face, the magnet poles being geometrically matched with the armature poles to form

respective longitudinally extending pairs of an armature pole and a magnetic pole, said armature pole end face having boundaries defining a surface area which during rotation of the armature in response to rotary angle adjustment of the control element overlaps the boundaries of an opposing surface area of a magnetic pole end face and forms therebetween an air gap, the magnetic attraction between opposed pole end faces being proportioned to the extent of surface area overlap between said pole pairs, at least one end face of each pair of poles having substantially constant lateral width from one longitudinal end to the other, said other pole end face having substantially wedge shape so as to be of increasing lateral width from one end to the other, the extent to which the boundaries of said surface areas overlap simultaneously progressively increase in both longitudinally and laterally extending directions as said armature is rotated in response to an increase in the rotary angle adjustment of said final control element counter to said restoring force, and said stationary armature counterpart also including a magnet coil to which an electric current intensity is applied.

4,504,771
ROBOT CONTROL APPARATUS

Hajimu Inaba, Hino, and Shinsuke Sakakibara, Komae, both of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

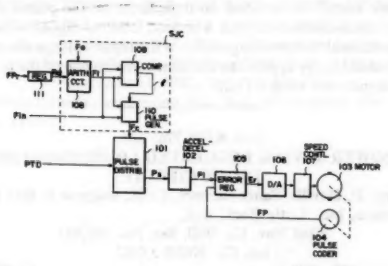
PCT No. PCT/JP82/00121, § 371 Date Dec. 7, 1982, § 102(e) Date Dec. 7, 1982, PCT Pub. No. WO82/03706, PCT Pub. Date Oct. 28, 1982

PCT Filed Apr. 15, 1982, Ser. No. 451,160

Claims priority, application Japan, Apr. 15, 1981, 56-056444

Int. Cl.³ G05B *13/00*

U.S. Cl. 318—561 **8 Claims**



1. A robot control apparatus, producing a drive signal for a rotational drive unit based on commands defining position and speed, for controlling an industrial robot having an arm extendable in the longitudinal direction and rotatable about an axis of rotation by the rotational drive unit, said robot control apparatus comprising:

a rotational speed decision unit, operatively connected to receive a current arm length and an input speed, for computing an allowable rotational speed of said arm in accordance with the current arm length, for comparing the input speed with the computed allowable rotational speed, and for delivering, as a commanded speed, the slower of the input and computed allowable rotational speeds; and

a drive circuit, operatively connected to said rotational speed decision unit and to receive the input position data, for producing the drive signal from the commanded speed delivered by said rotational speed decision unit and the input position data.

4,504,772
METHOD OF SENSING CURRENT POSITION IN POSITION CONTROL SYSTEM

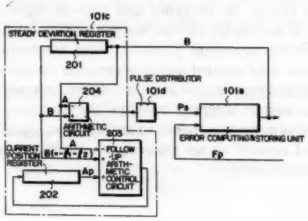
Hitoshi Matsuura; Etsuo Yamazaki, both of Hachioji, and Hiroshi Sakurai, Hino, all of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

Filed Nov. 17, 1982, Ser. No. 442,423

Claims priority, application Japan, Nov. 25, 1981, 56-188595

Int. Cl.³ G05B *19/28*

U.S. Cl. 318—603 **7 Claims**



7. A method for sensing the current position of a movable element in a position control system including a machine tool circuit having a servomotor, a tracer circuit operatively connected to the machine tool circuit and including a first current position register, and a numerical control circuit operatively connected to the machine tool circuit and including a memory, a second current position register and an error computing and storing unit for storing a steady deviation data, comprising the steps of:

(a) reading and storing the steady deviation data of the error computing and storing unit in the memory after the servomotor has been rotated;

(b) updating the contents of the first current position register using a value obtained by subtracting the contents of the memory unit from the contents remaining in the error computing and storing unit while the servomotor is under the control of the tracer circuit; and

(c) revising the data in the error computing and storing unit based on the value determined in said step (b).

4,504,773
CAPACITOR DISCHARGE CIRCUIT

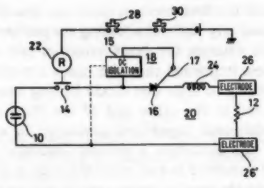
Seiichi Suzuki, Fukushima, and Eihachiro Tomita, Kanagawa, both of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha and Radio Research Technical, Inc., both of Tokyo, Japan

Filed Sep. 8, 1982, Ser. No. 415,831

Claims priority, application Japan, Sep. 10, 1981, 56-142832

Int. Cl.³ H02J *7/00*

U.S. Cl. 320—1 **8 Claims**



2. A capacitor discharge circuit for a defibrillator comprising:

a mechanical switch having mechanical make-contact connected to the output of a capacitor which is charged by a DC high voltage source;

an electronic switch connected in series to the output of the

mechanical switch, the output of said electronic switch being connected to a load;

a control signal generation circuit for generating a turn-on signal to be supplied to a control input of said electronic switch, said control signal generation circuit being connected to the output of said mechanical switch;

a DC isolating means for feeding a reduced operation voltage from the output of said mechanical switch to said control signal generation circuit with electrical isolation therebetween; and

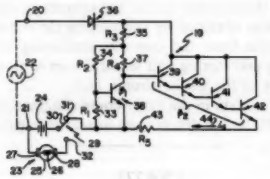
a delay circuit for delaying said turn-on signal, the delay time of said delay circuit being a period longer than the chattering operation period of said mechanical switch; wherein said control signal generation circuit is operated when said mechanical switch is turned on, and said electronic switch is turned on after the chattering operation period is over in response to said turn-on signal generated in said control signal generation circuit and delayed by said delay circuit.

4,504,774

CURRENT REGULATING CIRCUIT

Philip A. Hoffman, Towson, Md., assignor to Solid State Chargers Research and Development Limited Partnership, Lutherville, Md.

Filed Mar. 7, 1983, Ser. No. 472,758
Int. Cl.³ H02J 7/00
U.S. Cl. 320—9 **30 Claims**



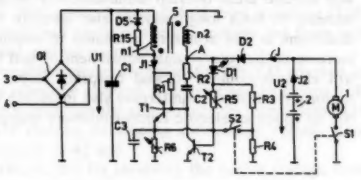
19. In a control circuit for a battery charger, the combination of a first resistance, a second resistance, and a third resistance connected in series with each other, a transistor having a collector, emitter and base, the base being connected to the junction of the first and second resistances, the emitter being connected to the other end of the first resistance, and a fourth resistance having one end thereof connected to the junction of the second and third resistances and the other end thereof connected to the collector of the transistor, wherein the individual values of the first, second, third and fourth resistances can vary substantially without affecting the performance of the control circuit, wherein the exact values of said resistors are substantially less important than the ratios therebetween, and further comprising at least one diode having one of its electrodes connected to the other end of the third resistance, a plurality of additional transistors connected in a Darlington configuration and including a second transistor and a final transistor, said transistor in said control circuit and said second transistor in said Darlington configuration having their respective collector and base conductively connected, each of said additional transistors having its collector coupled to a circuit point between said third resistance and an electrode of said diode, and a fifth resistance, said last transistor in said Darlington configuration and said transistor in said control circuit havinng their emitters connected via said fifth resistance.

4,504,775

SELF OSCILLATING, SINGLE-ENDED FLYBACK CONVERTER WITH INPUT VOLTAGE RESPONSIVE CONTROL

Klaus Becker, Kapellenweg 38, Strullendorf, Fed. Rep. of Germany (D-8602)

PCT No. PCT/DE80/00176, § 371 Date Jul. 24, 1981, § 102(e) Date Jul. 24, 1981, PCT Pub. No. WO81/01634, PCT Pub. Date Jun. 11, 1981
PCT Filed Nov. 29, 1980, Ser. No. 287,720
Claims priority, application Fed. Rep. of Germany, Nov. 29, 1979, 2948054; Oct. 30, 1980, 3040875
Int. Cl.³ H02J 7/10
U.S. Cl. 320—32 **8 Claims**



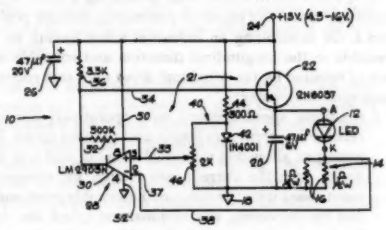
1. A circuit arrangement for the controlled supply of a load, from input voltage sources of different voltages, using a blocking converter comprising a transformer (5), the primary winding (n1) of which is connected to the input voltage source by way of a first controllable semiconductor switch (T1) and which supplies the load by way of one of its windings (n2), and a second controllable semiconductor switch (T2) having a control electrode to which there is applied a control signal which is proportional to the primary current (I1) flowing through the primary winding so that the second semiconductor switch produces switching-off of the first semiconductor switch and thus makes the period for which the first semiconductor switch is switched on dependent on the primary current, characterised in that a second control signal which is proportional to the voltage (U1) of the input voltage source (3, 4) is additionally applied to the control electrode of the second semiconductor switch (T2).

4,504,776

POWER SAVING REGULATED LIGHT EMITTING DIODE CIRCUIT

George D. Haville, Santa Barbara, Calif., assignor to BEI Electronics, Inc., Little Rock, Ark.

Filed Nov. 12, 1980, Ser. No. 205,941
Int. Cl.³ H05B 37/02
U.S. Cl. 323—288 **12 Claims**



1. A power saving regulated light source circuit, comprising a light emitting diode,

a direct current source and a switching transistor connected in series with said light emitting diode,

a control voltage producing resistor connected in series with said light emitting diode to produce a control voltage corresponding to the current through said light emitting diode,

a storage capacitor connected directly to said switching transistor and in parallel with the series combination of said light emitting diode and said resistor,

a switching comparator having its output connected directly to the input of said transistor,

said switching comparator having a reference input and a control input,

stabilized biasing means for supplying a stabilized biasing voltage to said reference input,

and means directly connecting said control input of said switching comparator to said control voltage producing resistor,

said switching comparator affording a triggering action between a first output state when the voltage at said reference input exceeds the voltage at said control input and a second output state when the voltage at said control input exceeds the voltage at said reference input,

said transistor being conductive in response to said first output state and being nonconductive in response to said second output state,

said transistor when conductive being effective to directly charge said capacitor and to increase said control voltage until said switching comparator is triggered to said second output state,

said switching comparator being triggered to said first output state when said control voltage becomes less than said reference voltage due to the discharging of said capacitor through said light emitting diode,

whereby said switching comparator is cycled repeatedly between said first and second output states and said transistor is cycled repeatedly between conductive and nonconductive states.

4,504,777

CONTROL CIRCUIT FOR HOLDING CONSTANT THE OPERATING VOLTAGE OF AN ELECTRIC LOAD

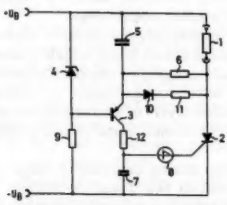
Anton Bauer, Kelkheim, Fed. Rep. of Germany, assignor to Braun Aktiengesellschaft, Kronberg, Fed. Rep. of Germany

Filed Dec. 14, 1982, Ser. No. 449,710

Claims priority, application Fed. Rep. of Germany, Dec. 14, 1981, 3149447

Int. Cl.³ G05F *5/00*

U.S. Cl. 323—300 **9 Claims**



1. A control circuit for receiving a relatively wide range of supply line voltages from positive and negative voltage supply terminals and for supplying therefrom a relatively constant operating voltage to an electrical load, comprising;

an electronic switch having an anode, a cathode and a control terminal cathode line, said anode of said electronic switch being connected to said electrical load to form a series circuit connected across said voltage supply terminals;

reference voltage generating means for generating a substantially constant reference voltage;

a first resistor connected in series with said reference voltage generating means across said voltage supply terminals;

a first capacitor and a second resistor connected in series across said electrical load;

a transistor having an emitter connected to the junction of said first capacitor and second resistor, a base connected to the junction of said reference voltage generating means and said first resistor, and a collector connected to said control terminal cathode line of said electronic switch; and

a second capacitor connected between said collector of said transistor and said negative voltage supply terminal.

4,504,778

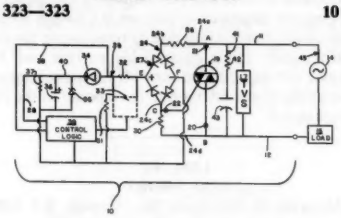
SELF-POWERED, SELF-REGULATED, ELECTRONIC AC CONTROL SYSTEM

Wayne W. Evans, Roswell, Ga., assignor to Electronic Systems International, Inc., Norcross, Ga.

Filed Jul. 15, 1982, Ser. No. 398,325

Int. Cl.³ G05F *5/00*

U.S. Cl. 323—323 **10 Claims**



1. Apparatus for controlling the operation of a load, which load is provided by a circuit with alternating current from an AC power source, said apparatus comprising:

a bidirectional thyristor positioned in series with the load and the AC power source, said thyristor including a first main terminal, a second main terminal, and a gate terminal;

a first resistance element positioned in a parallel circuit in parallel with said thyristor between said first main terminal and said gate terminal;

second resistance element selectively shorted and unshorted out of and into said parallel circuit in series with said first resistance element and between said first main terminal and said gate terminal of said thyristor;

third resistance element positioned in said parallel circuit between said gate terminal and said second main terminal of said thyristor; and

control logic circuitry powered by power provided by the voltage drop across said thyristor, said control logic circuitry including means for shorting and unshorting said second resistance element out of and into said parallel circuit in series with said first resistance element, whereby unshorting of said second resistance element into said parallel circuit places said thyristor in a nonconducting mode and shorting of said second resistance element out of said parallel circuit places the thyristor in a current conducting mode, thus turning the load off and on, respectively.

4,504,779

ELECTRICAL LOAD DRIVE AND CONTROL SYSTEM

Daniel J. Haman, Boise, Id., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Mar. 11, 1983, Ser. No. 474,388

Int. Cl.³ G05F *1/56*; H03K *17/00*

U.S. Cl. 323—349 **7 Claims**

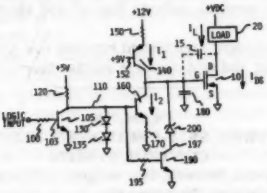
1. Apparatus for supplying power from a DC power supply to a load in response to an external control signal, said apparatus comprising:

an internal control signal generator for producing internal

control signals having independently selectable rising and falling slopes; and

switch means having an input terminal coupled to the internal control signal generator and output terminals for coupling said DC power to said load at a rate of change controlled by said slopes of the internal control signals;

said internal control signal generator including a capacitor



connected to the input terminal of the switch means, a controllable current source, coupled to the capacitor, for charging the capacitor to turn on the switch means at a substantially linear rising rate in response to the external control signal; and a controllable current sink for discharging the capacitor to turn off the switch means at a substantially linear falling rate in response to the external control signal.

4,504,780

TEST PROBE

John R. Marsella, 96 Horseneck Rd., Warwick, R.I. 02886

Filed Aug. 25, 1982, Ser. No. 411,450

Int. Cl.³ G01N *31/02*

U.S. Cl. 324—72.5 **5 Claims**

1. A test probe comprising an elongated tubular housing; a plunger received in said housing, said plunger having a probe end external to the housing and an enlargement at the inner end thereof slidably engaging the inner wall of the housing; a compression spring in said housing urging the plunger out of the housing; an inwardly directed detent means on the housing forming a stop for outward movement of the plunger; said enlargement having at least a portion thereof urged outwardly and compressible inwardly whereby the enlargement provides a low electrical resistance connection to the housing and yet permits removal of the plunger from the housing.

4,504,781

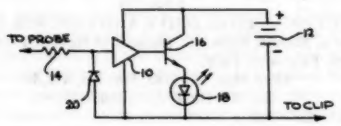
VOLTAGE WAND

Douglas L. Hargrove, 2116 Winslow Ct., Modesto, Calif. 94535

Filed Sep. 30, 1982, Ser. No. 430,398

Int. Cl.³ G01R *31/02*

U.S. Cl. 324—72.5 **16 Claims**



1. Apparatus for detecting the presence of an AC, pulsed DC or DC voltage, comprising:

a high input impedance C-MOS digital device;

power supply means connected to the C-MOS device;

a nonconductive casing, the C-MOS device and power supply means being contained within the casing;

a conductive probe electrically connected to the input of the C-MOS device and extending from the casing;

a nonconductive cap removably mounted to the casing to cover the probe extending from the casing;

a piece of conductive foam mounted in the removable cap which is held in electrical contact with the probe when the cap is mounted to the casing; and

indicator means connected to the output of the C-MOS device and extending from the casing.

4,504,782

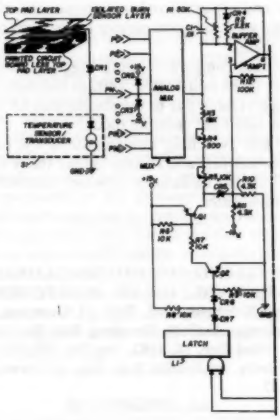
DETECTION OF CATASTROPHIC FAILURE OF DIELECTRIC, IMPROPER CONNECTION, AND TEMPERATURE OF A PRINTED CIRCUIT ASSEMBLY VIA ONE WIRE

Terry B. Zbinden, Maple Grove, Minn., assignor to Sperry Corporation, New York, N.Y.

Filed Jul. 6, 1982, Ser. No. 395,511

Int. Cl.³ G01R *31/12*

U.S. Cl. 324—73 PC **8 Claims**



1. A method of detecting the breakdown by burning of the electrically insulating dielectric within a multilayer printed circuit board, said method comprising:

establishing an electrically conductive layer within said multilayer printed circuit board which is normally continually electrically isolated by electrically insulating dielectric from any other voltage, signal, or ground as is transmitted upon other layers of said multilayer printed circuit board during operational usage of said multilayer printed circuit board;

electrically biasing during operational usage of said multilayer printed circuit board said electrically isolated conductive layer with a first voltage of greater voltage magnitude than any other voltage, signal, or ground as is transmitted upon other layers of said multilayer printed circit board during said operational usage of said multilayer printed circuit board;

sensing during operational usage of said multilayer printed circuit board said first voltage in order to determined IF a first level of said first voltage is sensed THEN substantially no current leakage between said electrically isolated layer and any other said voltage, signal, or ground within said multilayer printed circuit board is transpiring ELSE IF a second level of said first voltage is sensed THEN conductive current flow is transpiring between said elec-

trically isolated layer and at least some one of said other voltage, signal, or ground within said multilayer printed circuit board;

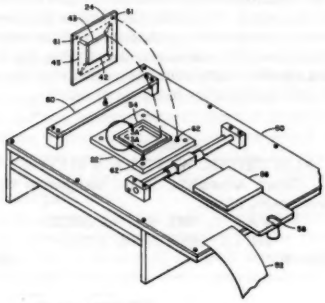
wherein said sensing determination of said second level of said first voltage means that said dielectric electrically insulating said isolated conductive layer from at least some one of said other voltage, signal, or ground within said multilayer pritned circuit board has failed by becoming electrically conductive which occurs through carbonization attendant upon burning during said operational usage of said multilayer printed circuit board.

4,504,783

TEST FIXTURE FOR PROVIDING ELECTRICAL ACCESS TO EACH I/O PIN OF A VLSI CHIP HAVING A LARGE NUMBER OF I/O PINS

John Zasio, Sunnyvale; Dwight Elvey, Santa Cruz, and Ronald Tanizawa, San Jose, all of Calif., assignors to STORAGE Technology Partners, Louisville, Colo.

Filed Sep. 30, 1982, Ser. No. 429,898
Int. Cl.³ G01R *15/12*
U.S. Cl. 324—73 R **9 Claims**



1. A test fixture for use with VLSI chips comprising:

computing means for defining and controlling a set of selectable tests that are to be performed on a VLSI chip; and

fixture means for receiving and holding said VLSI chip, said VLSI chip having at least 150 I/O pins, said fixture means including a test stand and a circuit board mounted to said test stand, said VLSI chip being detachably coupled to said circuit board, said fixture means further including means for transferring test signals and data between said computing means and said fixture means, said fixture means comprising:

mounting means for detachably holding said VLSI chip within said fixture means such that electrical contact may be selectively made with all of the I/O pins of said chip, said mounting means including

a paddle card to which the VLSI chip to be tested may be mounted, said paddle card having pin connection means for making electrical contract between each I/O pin of the VLSI chip and a respective pin contact point positioned on said paddle card,

connector means for making simultaneous electrical contact between each pin contact point of the paddle card and a respective I/O contact point of said circuit board, said connector means comprising

a test head adapted to be placed between said circuit board and said paddle card such that a receiving channel of said test head is positioned over said I/O contact points of the circuit board and said pin contact points of the paddle card and

connection strips inserted into said receiving channel, said connection strips having spaced-apart insulated wires therein that lie substantially orthogonal to said circuit board and said paddle card, and

holding means for detachably positioning and holding said paddle card under pressure against said connector means, whereby a first tip of each of said wires makes contact with a desired I/O contact point of the circuit board at the same time that a second tip of said wire makes contact with a corresponding pin contact point of the paddle card whenever said holding means holds the paddle card under pressure against the test head, and

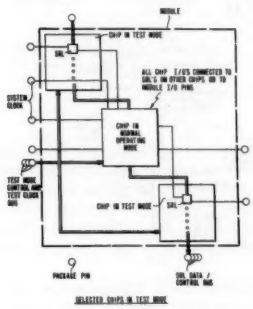
register means mounted to said circuit board for controllably transferring said test signals and data to or from desired I/O contact points of said circuit board, whereby said test signals and data may be transferred to desired I/O pins of said VLSI chip under control of said computing means.

4,504,784

METHOD OF ELECTRICALLY TESTING A PACKAGING STRUCTURE HAVING N INTERCONNECTED INTEGRATED CIRCUIT CHIPS

Prabhakar Goel, and Maurice T. McMahon, both of Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 280,050, Jul. 2, 1981, Pat. No. 4,441,075.
This application Jul. 29, 1983, Ser. No. 518,722
Int. Cl.³ G01R *31/28*
U.S. Cl. 324—73 R **2 Claims**



1. A method for performing an electrical test on a packaging structure containing n interconnected integrated circuit chips, each of said n integrated circuit chips including test circuit means, said test circuit means including scan-in scan-out circuit means, said scan-in scan-out circuit means including shift register latch circuit means, said test circuit means of each of said n integrated circuit chips further including control circuit means, said control circuit means cooperating with said scan-in scan-out circuit means of each of said n interconnected integrated circuit chips, said control circuit means being controllable to place all but any selected one of said n interconnected integrated circuit chips in a "test" mode, said selected one of said n interconnected integrated circuit chips being a chip under test, said packaging structure being characterized in that electrical contact to said packaging structure and each of said n interconnected integrated circuit chips is only provided through a plurality of accessible packaging contacts, said packaging structure including wiring for interconnecting said n interconnected integrated circuit chips one with another and said accessible packaging contacts, said wiring of said packaging structure including wiring for connecting said scan-in scan-out circuit means of said test circuit means of each of said n integrated circuit chips into a single packaging structure scan-in scan-out circuit means, said method determining the electrical integrity of any predetermined one of said plurality of integrated circuit chips and including in the order recited the following steps:

(1) placing a binary value in said packaging structure scan-in scan-out circuit means;

(2) placing each chip of said n interconnected integrated circuit chips, except said any selected one of said n integrated circuit chips, in a "test mode", whereby said selected one of said n interconnected integrated circuit chips is a "chip under test (CUT)";

(3) employing at least the binary value placed in said packaging structure scan-in-scan-out circuit means impress a binary value input on the integrated circuit chip under test; and

(4) employing at least the packaging structure scan-in-scan-out circuit means obtain and examine a binary output from said chip under test to determine the electrical integrity of said chip under test, wherein the term electrical integrity of said chip under test is defined as determining whether or not said integrated circuit chip under test is electrically defective.

4,504,785

SAMPLING SPECTRUM ANALYZER

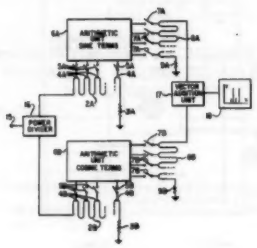
Trevor W. Tucker, Nepean, and Larry J. Conway, Kanata, both of Canada, assignors to Her Majesty the Queen in right of Canada, as represented by the Minister of National Defence of Her Majesty's Canadian Government, Ottawa, Canada

Filed Mar. 7, 1983, Ser. No. 472,794

Claims priority, application Canada, Mar. 18, 1982, 398750

Int. Cl.[3] G01R *23/16*

U.S. Cl. 324—77 H **10 Claims**



1. A sampling spectrum analyzer comprising:

(a) means supplying an input signal,

(b) means for repetitively simultaneously sampling successive time spaced components of said input signal, and

(c) means for transforming each sample according to one of the transforms

$$\sum_{n=0}^{N-1} fn \cos\left(\frac{2\pi mn}{NT}\right) \text{ and } \sum_{n=0}^{N-1} fn \sin\left(\frac{2\pi mn}{NT}\right)$$

in which

m/NT is the frequency of the m^{th} frequency component,

m is 0, 1 . . . N−1,

fn is the n^{th} sample of the input signal, and

T is the sampling interval between successive samples, to obtain a plurality of signals each representative of a different frequency component of the input signal.

4,504,786

SIGNAL DETECTOR

Grimes G. Slaughter, 240 N. Purdue Ave., Apt. 211, Oak Ridge, Tenn. 37830

Filed Jun. 14, 1982, Ser. No. 387,945

Int. Cl.[3] G01R *23/02*

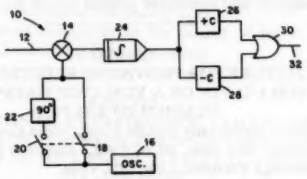
U.S. Cl. 324—78 R **21 Claims**

1. A frequency detector for detecting in an input signal the presence of signals within a selected frequency bandwidth of a selected interrogation frequency, comprising:

oscillator means for generating an interrogation signal having the selected interrogation frequency;

first multiplier means for multiplying the input signal and the interrogation signal to produce a first multiplier signal;

first integration means for integrating the first multiplier signal over a predetermined time interval to produce a first integration signal which corresponds to the presence of an input signal within the bandwidth of the interroga-



tion frequency, said predetermined time interval being inversely proportional to the bandwidth such that one-half the bandwidth is approximately equal to the interrogation frequency divided by the number of interrogation frequency cycles in the predetermined time interval; and

analyzing means for receiving and analyzing the first integration signal to determine the presence of the selected interrogation frequency in the input signal.

4,504,787

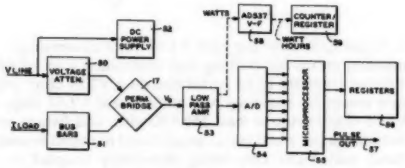
ELECTRONIC WATTHOUR METER

Norman G. Planer, Annandale, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Apr. 5, 1982, Ser. No. 365,226

Int. Cl.[3] G01R *21/06, 33/00*

U.S. Cl. 324—142 **14 Claims**



7. An electric watthour meter for measuring AC power consumption comprising:

a pair of connection means for connecting to a corresponding pair of line voltage conductors for carrying the electrical power to be measured;

a pair of spaced parallel plate bus bar means connected in series with said line voltage conductors by means of said connection means, said bus bars being configured and disposed so as to approximate infinite current sheets;

magnetoresistive bridge sensor means disposed between said pair of bus bars means;

a source of biasing voltage connected to two nodes of said bridge sensor;

said bridge sensor means being disposed such that the flow of current in either or both of said bus bar means produces a corresponding voltage output signal from said bridge sensor means indicative of the total amount of power flowing in both said bus bar means;

signal processing means connected to the output of said bridge sensor means for utilizing the output signal from said bridge sensor means to produce a power consumption output indicative of the total AC power conducted by said bus bar means; and

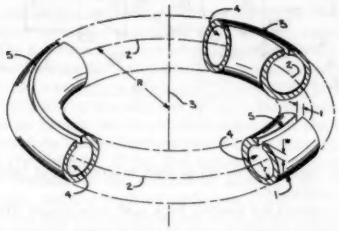
output utilization means connected to said signal processing means for utilizing said power consumption output.

4,504,788

ENCLOSED LOOP-GAP RESONATOR

Wojciech Froncisz, Krakow, Poland, and James S. Hyde, Dousman, Wis., assignors to The Medical College of Wisconsin, Inc., Milwaukee, Wis.

Filed Sep. 3, 1982, Ser. No. 414,642
Int. Cl.[3] G01R *33/08*; H03H *1/00*
U.S. Cl. 324—316 5 Claims



1. A lumped circuit resonator for applying magnetic flux to a sample material which comprises:

a chamber formed by extending a conductive loop along a closed path which encircles an axis of revolution;

a gap formed in the conductive loop and extending along its entire length around the axis of revolution;

wherein the loop forms a lumped inductive element and the gap forms a lumped capacitive element which resonate when electromagnetic energy is coupled thereto to produce a magnetic flux which flows in the chamber along the closed path, and

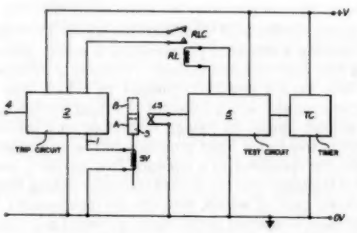
in which an opening is formed in the loop to enable magnetic flux contained within the chamber to flow outside the chamber over a portion of the path around the axis of revolution for application to the sample material.

4,504,789

EQUIPMENT FOR TESTING ELECTRICAL DEVICES SUCH AS SOLENOIDS

Edward H. Carr, Stockton-on-Tees; Harry W. Knight, Darlington, and Richard C. Turnock, Billingham, all of England, assignors to Imperial Chemical Industries PLC, Great Britain

Filed Apr. 7, 1982, Ser. No. 366,351
Claims priority, application United Kingdom, Apr. 9, 1981, 8111143
Int. Cl.[3] G01R *31/02, 31/32*
U.S. Cl. 324—418 11 Claims



1. Equipment for testing an electrical device of the type wherein changing the electrical state of the device from a first condition to a second condition causes an operation to commence, and restoration of the first condition causes said operation to stop, comprising

(i) means for changing said electrical state from the first condition to the second condition, so as to cause said operation to commence,

(ii) means responsive to said operation to generate a first signal when said operation has proceeded to a predetermined extent,

(iii) timer means for producing a second signal at a predetermined period of time after said electrical state changes from said first condition to said second condition,

(iv) means, responsive to the first of said signals to occur, to restore the electrical state of said device to the first condition, and

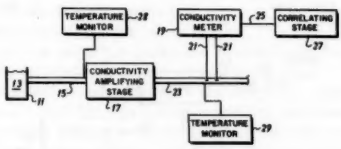
(v) means to indicate which signal caused restoration of the electrical state to said first condition.

4,504,790

APPARATUS AND METHOD FOR DETERMINING THE WATER CONTENT OF A WATER-CONTAINING MIXTURE

Martin S. Frant, Newton, Mass., assignor to The Foxboro Company, Foxboro, Mass.

Filed Oct. 5, 1981, Ser. No. 308,312
Int. Cl.[3] G01N *27/02*
U.S. Cl. 324—439 6 Claims



1. Apparatus for determining the proportion of water within a mixture containing water and ethanol, comprising:

a housing containing a bed of an ionizable, water-soluble salt, said salt being relatively insoluble in ethanol, relative to its solubility in water, and said housing having inlet and outlet ports to permit said mixture to flow through said salt;

a spring-biased piston located within said housing and disposed to bear against said bed of salt, so as to keep said salt tightly compacted;

means coupled to said outlet port for measuring the electrical conductivity of said mixture after it has flowed through said bed of salt; and

means for relating the measured conductivity to the proportion of water in the mixture.

4,504,791

SAMPLING FREQUENCY CONVERTER

Larry J. Conway, Kanata; Trevor W. Tucker, Ottawa, and Sylvain L. Bouchard, Gatineau, all of Canada, assignors to Her Majesty the Queen in right of Canada, as represented by Minister of National Defence of Her Majesty's Canadian Government, Ottawa, Canada

Filed Sep. 7, 1982, Ser. No. 415,618
Claims priority, application Canada, Oct. 2, 1981, 387202
Int. Cl.[3] G11C *19/28*
U.S. Cl. 328—15 11 Claims

1. A signal frequency converter comprising:

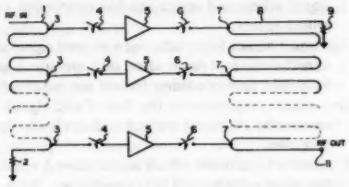
(a) an input delay line for carrying an input signal, said input delay line including a plurality of taps;

(b) first sampling means for sampling the input signal at first predetermined tap locations of the input delay line at first predetermined times;

(c) an output delay line having a plurality of second predetermined tap locations with different delay times between taps than the input delay line; and

(d) second sampling means for applying the samples of the

input signals to the second predetermined tap locations at second predetermined times to generate an output signal



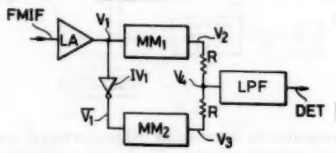
in said output delay line having a frequency different from the frequency of the input signal.

4,504,792

FM DETECTOR USING MONOSTABLE MULTIVIBRATORS

Makoto Furihata, Gunma, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 1, 1983, Ser. No. 462,961
Claims priority, application Japan, Feb. 10, 1982, 57-18744
Int. Cl.³ H03D *3/00*; H03K *9/06*
U.S. Cl. 329—106 **20 Claims**



1. A frequency modulation detector comprising:

means including a plurality of monostable multivibrators each responsive to a frequency modulated input signal for generating respective output signals of predetermined pulse width Wp in response to rising or falling edges of said input signal;

analog adder means for analog adding the respective output signals of said plurality of monostable multivibrators; and

a low-pass filter having an input terminal which is connected to receive the output signal from said analog adder means and having an output terminal which provides a detection output signal, wherein said predetermined pulse width Wp and a pulse width Wp' of said input signal at the time at which the frequency of said input signal is at the center frequency of the frequency modulated intermediate frequency input signal have the relationship $Wp=N\cdot Wp'$ wherein N is an integer.

4,504,793

PULSE-WIDTH MODULATION CIRCUIT

Kenji Yokoyama, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan

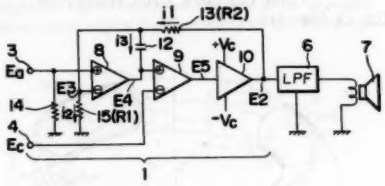
Filed Jan. 4, 1983, Ser. No. 455,497
Claims priority, application Japan, Jan. 29, 1982, 57-12632
Int. Cl.³ H03F *3/38*
U.S. Cl. 330—10 **7 Claims**

1. A pulse-width modulation circuit by which an input signal is pulse-width modulated by means of a carrier signal comprising:

first amplifier means having inverting and non-inverting input terminals and a first output terminal, said input signal being applied to one of said inverting and non-inverting input terminals;

capacitor means connected between said output and inverting input terminals;

comparator means having first and second input terminals and a second output terminal, an output signal from said first amplifier means being applied to said first input terminal and said carrier signal being applied to said second input terminal, said comparator means comparing said output signal from said first amplifier means with said



carrier signal to deliver at said second output terminal a pulse signal; and

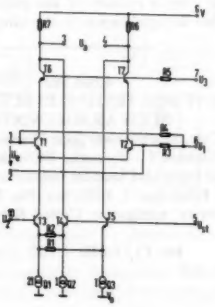
feedback means for feeding back said pulse signal from said comparator means to said inverting input terminal of said first amplifier means, wherein said pulse signal is a pulse-width modulated signal of said input signal.

4,504,794

INTEGRABLE DIFFERENTIAL AMPLIFIER

Josef Fenk, Eching/Ottenburg, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Feb. 4, 1983, Ser. No. 463,914
Claims priority, application Fed. Rep. of Germany, Feb. 9, 1982, 3204430
Int. Cl.³ H03F *3/45*
U.S. Cl. 330—254 **4 Claims**



1. Integrable differential amplifier having a d-c voltage source delivering a reference potential and a supply potential wherein a first and a second transistor forming a differential amplifier unit have a respective emitter by which they are connected in common with a collector of a third transistor, the first and second transistors having respective base terminals forming respective signal input terminals and being connected via a respective resistance to a common first auxiliary potential, the first transistor and the second transistor having respective collectors, each of which, through the intermediary of a ballast resistance connected to the supply potential and a terminal appertaining to the ballast resistance of the respective first and second transistors, being directly connected, respectively, to a signal output terminal of the amplifier, the respective emitters of the first and second transistors being connected to the reference potential via the emitter of the third transistor, the third transistor having a base to which a second auxiliary potential is applied, comprising a fourth and a fifth transistor having respective emitters connected together with the emitter

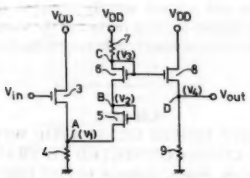
of the third transistor to the reference potential via a respective constant current source, said fourth and said fifth transistors having respective bases to which a control signal related to the reference potential is applied in common, said emitter of said fourth transistor and said emitter of said fifth transistor being connected to the emitter of the third transistor, said fourth and said fifth transistors having respective collectors which, with respect to a respective branch of the differential amplifier unit controlled by the collector of the first transistor and by the second transistor, respectively, are connected in such manner to the differential amplifier unit that a current flowing through the ballast resistance associated with the first transistor is affected by a collector current of said fourth transistor, and that a current flowing through the ballast resistance associated with the second transistor is affected by a collector current of said fifth transistor, said collectors of said fourth and said fifth transistors having no direct connection with the connected emitters of the first and second transistors, a sixth transistor via which the collector of the first transistor is connected to an output terminal of the differential amplifier unit associated therewith, and a seventh transistor via which the collector of the second transistor is connected to an output terminal of the differential amplifier unit associated therewith, both of said sixth and said seventh transistors operating in a respective cascode circuit and being controlled by a third auxiliary potential, and a common resistance via which said third auxiliary potential is applied to said sixth and said seventh transistors, respectively.

4,504,795

IMPEDANCE CONVERSION CIRCUIT USING FETS

Taku Gobara, and Hirozumi Misaki, both of Takatsuki, Japan, assignors to Matsushita Electronics Corporation, Kadoma, Japan

Filed Aug. 18, 1982, Ser. No. 409,346
Claims priority, application Japan, Apr. 28, 1981, 56-64892
Int. Cl.³ H03F *3/16*
U.S. Cl. 330—277 **7 Claims**



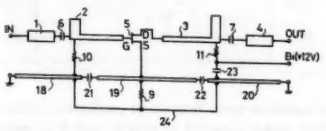
1. An impedance conversion circuit comprising:
a first source-follower circuit comprising a first FET, the gate electrode being for receiving an input signal, a first load resistance connected between the source electrode of said first FET and ground, the drain electrode being directly connected to a power source terminal, and an output terminal provided between said load resistance and the source electrode of said first FET,
a second FET connected by the source electrode to the output terminal of said first source-follower circuit, a first common connected point being made by connecting the gate electrode and the drain electrode of said second FET,
a third FET connected by the source electrode to said first common connected point, a second common connected point being formed by connecting the gate electrode and the drain electrode of said third FET,
a second load resistance connected between said power source terminal and the drain electrode of said third FET,
a second source-follower circuit comprising a fourth FET and a third load resistance, the fourth FET being connected by the gate electrode to said second common connected point, the source electrode being connected to ground through said third load resistance, and the drain electrode being directly connected to said power source terminal, the second source-follower circuit being used for issuing an output signal therefrom.

4,504,796

MICROWAVE CIRCUIT APPARATUS

Sadao Igarashi, Soma, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan

Filed Sep. 30, 1982, Ser. No. 431,126
Claims priority, application Japan, Nov. 26, 1981, 56-189573
Int. Cl.³ H03F *3/60, 3/193*
U.S. Cl. 330—286 **3 Claims**



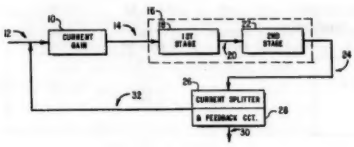
1. A microwave circuit apparatus comprising:
at least one first microstrip line;
at least one second microstrip line;
at least one capacitor interposed between said first microstrip line and said second microstrip line; and
a functional element having a first electrode thereof connected high frequency-wise to said first microstrip line;
said second microstrip line being grounded with respect to a power source, wherein said first microstrip line, said second microstrip line and at least one of said capacitors interposed between said first and second microstrip liens are disposed on the surface opposite the surface on which said functional element is disposed.

4,504,797

PREAMPLIFIER CIRCUITS

Fred L. Eatock, Cupertino, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Oct. 12, 1982, Ser. No. 433,582
Int. Cl.³ H03F *1/34*
U.S. Cl. 330—293 **11 Claims**

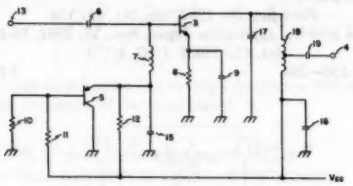


1. A preamplifier circuit comprising:
means for providing current gain, said current gain means having an input and an output port;
means for providing voltage gain, said voltage gain means having an input and an output port, the input port being connected to the output port of the current gain means for providing a short circuit impedance to a current at the input port of the voltage gain means and for producing a non-inverted output; and
means for splitting current, said current splitter means (a) having an input port connected to the output port of the voltage gain means for splitting current received therefrom to provide an output current of the preamplifier, (b) providing a feedback loop to the input port of the current gain means, and (c) forming a portion of an integrated circuit.

4,504,798
TRANSISTOR CIRCUIT INCLUDING BIASSING CIRCUIT

Yutaka Sasaki, Tokyo, Japan, assignor to Nippon Electric Co., Ltd., Tokyo, Japan

Filed Nov. 22, 1982, Ser. No. 443,331
Claims priority, application Japan, Nov. 24, 1981, 56-189008
Int. Cl.³ H03F 3/04
U.S. Cl. 330—296 7 Claims

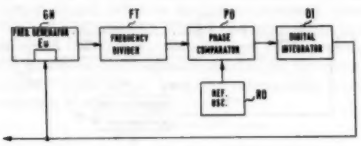


1. A transistor amplification or oscillation circuit having first transistor means coupled to supply said A.C. amplification or oscillation, and biasing means comprising a voltage divider and a second transistor means for supplying a D.C. biasing voltage to the base of said first transistor means, said voltage divider including at least resistor means having an output terminal for providing said D.C. biasing voltage, said second transistor means being coupled in an emitter follower configuration, the base of said second transistor means being coupled to said output terminal of said voltage dividing resistor means for receiving said D.C. biasing voltage and the emitter of said second transistor means being D.C. coupled to the base of said first transistor means to supply said D.C. biasing voltage thereto.

4,504,799
DIGITAL FREQUENCY/PHASE LOCKED LOOP

Herbert Elmis, Denzlingen, and Bernd Novotny, Gundelfingen, both of Fed. Rep. of Germany, assignors to ITT Industries, Inc., New York, N.Y.

Filed Jul. 10, 1981, Ser. No. 282,344
Claims priority, application Fed. Rep. of Germany, Jul. 23, 1980, 3027828
Int. Cl.³ H03L 7/18, 7/22
U.S. Cl. 331—1 A 35 Claims



1. A frequency/phase locked loop comprising:

a reference oscillator determinative of the frequency stability for providing reference signals at a reference frequency;

a frequency-controlled generator of a lower frequency stability than said reference oscillator providing output signals at a first or a second frequency, said generator being responsive to control signals for switching between said first and second frequencies, said second frequency being approximately one to ten percent higher than said first frequency, said first and second frequency both being substantially higher than said reference frequency;

a frequency divider coupled to said generator for generating an output signal of the same frequency as said reference oscillator;

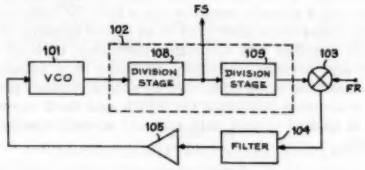
a digital phase comparator having a first input coupled to said reference oscillator, a second input coupled to the output of said frequency divider, and an output;

a digital integrating stage coupled to said digital phase comparator output for providing said control signals whereby during a first portion of a period of said reference signal said control signals select said first frequency and during a second portion of said period said control signals select said second frequency.

4,504,800
WIDE BAND FREQUENCY PHASE LOCKED LOOP FREQUENCY SYNTHESIZER

Eric Plouviez, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Jul. 9, 1982, Ser. No. 396,593
Claims priority, application France, Jul. 24, 1981, 81 14418
Int. Cl.³ H03L 7/18
U.S. Cl. 331—1 A 5 Claims

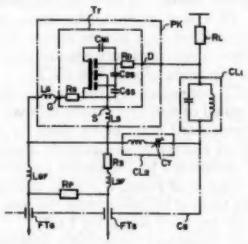


1. A wide band frequency synthesizer, of the type comprising a voltage controlled oscillator, and a phase control loop, comprising a divider for dividing by an integer number the frequency of the signal supplied by the oscillator, a phase comparator for comparing the signal supplied by the divider with a constant reference frequency signal and delivering an error signal measuring the frequency and phase difference between the compared signals, and means for controlling the oscillator by means of this error signal, wherein the divider comprises first and second serially coupled divider means having programmable division ranks and the synthesized signal being obtained at the connection between the first and second divider means.

4,504,801
MICROWAVE POWER GENERATOR WITH DUAL COAXIAL LINES CONNECTED TO TRANSISTOR

Hans Stut, Tokyo, Japan, assignor to Fuji Electronic Components Ltd., Tokyo, Japan

Filed Aug. 23, 1982, Ser. No. 410,858
Claims priority, application Japan, Aug. 21, 1981, 56-130217
Int. Cl.³ H03B 5/00
U.S. Cl. 331—117 D 20 Claims



1. A microwave power generating apparatus for generating oscillations at a predetermined microwave frequency, comprising:

a power MOS field effect transistor having a gate electrode,

a drain electrode and a source electrode, said transistor having drain-source and gate-source capacitances;

a drain side coaxial resonating system having a cavity comprising an internal conductor connected to said drain electrode and an external conductor surrounding said internal conductor, said cavity forming a parallel resonant circuit tuned to said predetermined microwave frequency;

a gate side coaxial resonating system having a cavity comprising an internal conductor connected to said gate electrode and an external conductor surrounding said internal conductor, said gate side coaxial resonating system further comprising a variable capacitor connected to said internal and external conductors, said cavity and said variable capacitor forming a series resonant circuit tuned to said predetermined microwave frequency;

means for connecting one end of each of said outer conductors of said drain and gate side coaxial resonating systems to a common potential point;

means for applying a DC power source voltage between said common potential point and said source electrode;

means for applying an oscillating control voltage signal to said gate electrode; and

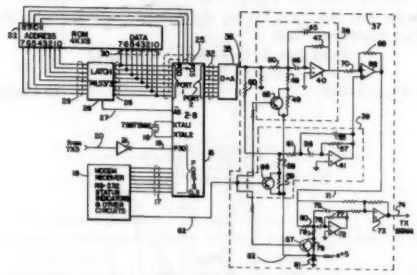
means for generating oscillations with a positive feedback ratio substantially determined by the ratio of the drain-source capacitance to the gate-source capacitance of said transistor, whereby the power output of said microwave power generating apparatus is derived from the internal conductor of said drain or gate side coaxial resonating system.

4,504,802

DIGITAL PSK MODULATOR FOR MODEM

Dale A. Heatherington, Alpharetta, Ga., assignor to Hayes Microcomputer Products, Inc., Atlanta, Ga.

Filed Jul. 27, 1983, Ser. No. 517,819
Int. Cl.[3] H04L *27/20*
U.S. Cl. 332—18 **4 Claims**



2. An improved phase shift keyed modulator for providing a carrier signal of predetermined frequency, represented by a vector in a phase plane at one of a set of predetermined phases in said phase plane with respect to a predetermined reference phase in said phase plane, and for selectively providing said carrier signal at a different one of said set of predetermined phases in response to an input data stream of data signals, comprising in combination:

shift control means responsive to a first set of N of said data signals, N being an integer greater than zero, to shift the phase of said carrier from a first one of said set of predetermined phases to a second one of said set of predetermined phases so that the end point of said vector traces a straight line in said phase plane between said first one and said second one of said set of predetermined phases; and

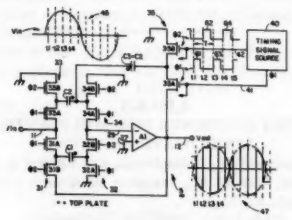
means for coupling said carrier signal to a transmission channel.

4,504,803

SWITCHED CAPACITOR AM MODULATOR/DEMODULATOR

Man S. Lee, San Mateo, and Chieh Chang, Belmont, both of Calif., assignors to GTE Lenkurt, Incorporated, Phoenix, Ariz.

Filed Jun. 28, 1982, Ser. No. 393,020
Int. Cl.[3] H03C *1/02;* **H03K** *7/00*
U.S. Cl. 332—31 R **13 Claims**



3. An integrable switched capacitor circuit for operating as an amplitude modulator or as an amplitude demodulator, comprising:

an input line adapted for receiving an analog input voltage,

an operational amplifier having an input terminal and an output terminal,

first, second and third capacitors **C1**, **C2** and **C3**, and

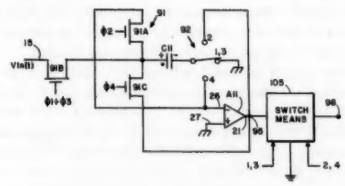
switch means alternately operative in first and second non-overlapping switch states, which are closed conditions of switching, for alternately charging **C1** with the input voltage on said input line in the first switch state while electrically connecting **C2** between said input line and said input terminal and connecting **C3** as a feedback capacitor across said amplifier for causing the latter to produce on said output terminal throughout the first switch state an inverted-continuous version of the input signal on said input line; and electrically discharging **C2** and **C3** in the second switch state while connecting **C1** as a feedback capacitor across said amplifier for producing on said output terminal throughout the second switch state a non-inverted sample of the input voltage.

4,504,804

SWITCHED CAPACITOR BALANCED MODULATOR/DEMODULATOR

Chieh Chang, Belmont, and Man S. Lee, San Mateo, both of Calif., assignors to GTE Lenkurt Incorporated, Phoenix, Ariz.

Filed Jun. 28, 1982, Ser. No. 393,229
Int. Cl.[3] H03C *1/02;* **H03K** *7/00*
U.S. Cl. 332—31 R **9 Claims**



1. An integrable switched capacitor circuit capable of performing one of amplitude modulation and demodulation comprising:

an operational amplifier having an input terminal and an output terminal;

a capacitor **C1** having one and other sides thereof; and

switch means periodically operating in combination with said amplifier in non-overlapping switch states which are

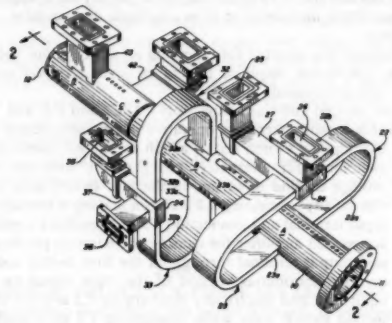
closed conditions of switching that occur sequentially at a prescribed rate for charging C1 with an input signal voltage in alternate ones of the switch states for obtaining sample voltages, and connecting C1 as a feedback capacitor across said input and output terminals of said amplifier in the other ones of the switch states with sample voltages on C1 of polarities requisite for generating one of a modulator and demodulator output signal voltage.

4,504,805

MULTI-PORT COMBINER FOR MULTI-FREQUENCY MICROWAVE SIGNALS

Ernest P. Ekelman, Jr., Bolingbrook, and Edward L. Ostertag, New Lenox, both of Ill., assignors to Andrew Corporation, Orland Park, Ill.

Filed Jun. 4, 1982, Ser. No. 384,997
Int. Cl.³ H01P 1/161, 5/12
U.S. Cl. 333—126 **41 Claims**



1. A combiner for transmitting and receiving co-polarized microwave signals in a selected propagation mode in at least first higher and second lower frequency bands, said combiner comprising

a main waveguide dimensioned to simultaneously propagate signals in said different frequency bands, at least a portion of said main waveguide being overmoded,

first and second junctions spaced along the length of said main waveguide for coupling signals in said different frequency bands in and out of said main waveguide, at least said first junction being located in an overmoded portion of said main waveguide and having side-arm waveguide means associated therewith, said first junction and said side-arm waveguide means being dimensioned to propagate signals in said first frequency band,

filtering means disposed within said main waveguide and having (1) a stopband characteristic for coupling signals in said first frequency band between said main waveguide and said first junction and said side-arm waveguide means associated therewith, and (2) a passband characteristic for passing signals in said second frequency band past said first junction, said filtering means longitudinally overlapping said first junction and being aligned with a longitudinal plane that is orthogonal to a longitudinal plane passing through said first junction,

said filtering means and said first junction suppressing spurious excitation of signals in undesired propagation modes different from said selected mode, and

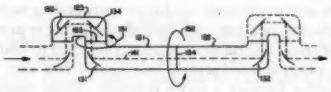
means for coupling signals in said second frequency band between said main waveguide and said second junction.

4,504,806

MODULAR BEAM WAVEGUIDE

James K. Conn, Indialantic, and Sharadchandra D. Patel, Melbourne, both of Fla., assignors to Harris Corporation, Melbourne, Fla.

Filed Jul. 19, 1982, Ser. No. 399,743
Int. Cl.³ H01P 3/14, 1/00, 1/02; F16L 11/00
U.S. Cl. 333—241 **31 Claims**



1. For use in the transmission of microwave energy a waveguide structure comprising:

a reflective surface upon which microwave energy travelling in a first direction and to be conveyed via said waveguide structure may impinge so as to be reflected in a second direction; and

a support structure within which said reflective surface is positioned, said support structure having first and second portions extending in said first and second directions respectively and through which microwave energy may be conveyed and reflected from said reflective surface; and

wherein

at least one of said first and second portions of said support structure is configured to be joined with one of the first and second portions of an adjacent support structure to be coupled thereto; and wherein

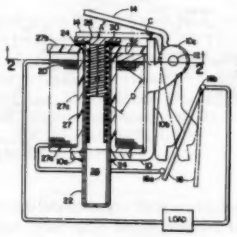
the medium of propagation of said microwave energy is exclusive of the material of which said support structure is made.

4,504,807

HIGH INRUSH CURRENT CIRCUIT BREAKER

Ramesh Nar, Hartford, Conn., assignor to Carlingswitch, Inc., West Hartford, Conn.

Filed Jun. 1, 1984, Ser. No. 616,312
Int. Cl.³ H01H 7/03
U.S. Cl. 335—61 **10 Claims**



1. An electromagnetic device comprising an L-shaped magnetizable frame with one and another frame leg oriented perpendicularly with respect to one another, a non-magnetizable spool having oppositely arranged top and bottom end flanges, said bottom end flange provided on said one frame leg, and said spool having an integrally formed axially extending central portion oriented parallel said another frame leg, an armature pivotally mounted to said frame for movement between a normal open position and a tripped position wherein said armature is oriented parallel said one frame leg and with a poriton of said armature lying adjacent the end of said another frame leg, biasing means to urge said armature toward its normal position, a non-magnetizable tube having a first end and a

second end with an intermediate portion of said tube mounted in an opening in said one frame leg, said tube provided coaxially inside a bore of said spool so that said second end of said tube is provided adjacent top end flange of said spool, a pole piece of magnetizable material fitted in the second end of said tube and adapted to be engaged by said armature in the latters tripped position, a magnetizable plunger slidably received in said tube for movement between out and in limit positions inside said tube and cooperating with said pole piece and said frame together with said plunger to provide a first magnetic circuit, and biasing means inside said tube to urge said plunger toward its out position, solenoid winding means provided on said spool central portion and adapted to cause a predetermined magnetic flux in said first magnetic circuit so that said armature is biased toward its trip position and said plunger is biased toward its in position, a U-shaped magnetizable member defining a secondary magnetic circuit that is in part coincident with said first circuit in that the frame and the plunger are included in said first and second circuits, said U-shaped member being received on said spool such that the legs of said U are outside said central spool portion, said U-shaped member provided proximate said top spool flange and proximate said solenoid winding means, said U-shaped member having legs defining a slot substantially equal to that of said spool central portion.

4,504,808

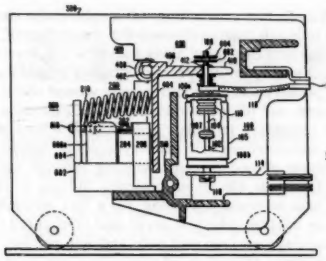
VACUUM CONTACTOR KICKOUT SPRING ADJUSTMENT APPARATUS

Robert T. Basnett, Hendersonville, N.C., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 19, 1983, Ser. No. 486,590

Int. Cl.³ H01H *9/02;* **H01F** *7/08*

U.S. Cl. 335—154 **16 Claims**



1. A vacuum contactor, comprising:

vacuum interrupter means for opening and closing an electrical circuit;

operating means for effecting the opening and closing of the vacuum interrupter means, the operating means including a spring for opening the vacuum interrupter means;

spring adjusting means providing for the controllable increase or decrease in the force of the spring thereby allowing for the insertion or removal of the spring in the operating means at a force substantially lower than the operating force of the spring, comprising;

a base;

a U-shaped bracket mounted on the base adjacent the spring and having opposed bores in the legs thereof;

a locking block intermediate the legs of the bracket and inserted in the opposed bores of the bracket;

a lever having a portion thereof in contact with one end of the spring and having one end thereof moveably mounted in the base; and

a rod having a shaft and a head, the shaft engaging the locking block, the head engaging the lever with the rod, locking block, bracket and base holding the lever against the force of the spring whereby movement of the rod in one direction moves the lever to increase the force of the spring while movement in the opposite direction moves the lever to decrease force of the spring; and

a housing for enclosing and supporting the vacuum interrupter means and the operating means.

4,504,809

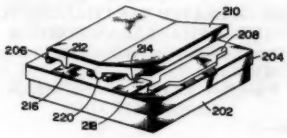
MINIATURE THERMOMAGNETIC RELAY

Jonathan C. Lueker, 12225 NW. Big Fir Ct., Portland, 97229, and Raymond A. Zandonatti, 11680 SW. Denfield, Beaverton, both of Oreg. 97005

Continuation of Ser. No. 449,036, Dec. 13, 1982, abandoned. This application May 15, 1984, Ser. No. 610,359

Int. Cl.³ H01H *51/00*

U.S. Cl. 335—208 **7 Claims**



1. A thermomagnetic relay comprising:

a plate of a hard magnetic material;

a substrate mounted on the plate;

a plurality of contact points on the substrate for forming electrical connections;

a moving element of a ferromagnetic material pivotably positioned on the substrate having contact points for selectively forming electrical interconnections of preselected ones of said contact points;

first and second ferromagnetic elements positioned on the substrate adjacent opposite ends of said moving element; and

first and second thermal means for selectively altering the temperature of said first and second ferromagnetic elements;

one of said plate and said moving element includes a permanent magnet with said moving element being affixed to said substrate by magnetic attraction.

4,504,810

ELECTROMAGNETIC DEVICES

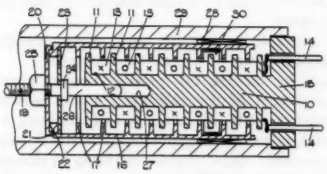
Frank M. Logie, London, and Ronald Phillips, Northolt, both of England, assignors to Lucas Industries Public Limited Company, Birmingham, England

Filed Aug. 13, 1982, Ser. No. 407,880

Claims priority, application United Kingdom, Aug. 22, 1981, 8125713

Int. Cl.³ H01F *7/08*

U.S. Cl. 335—261 **7 Claims**



1. An electromagnetic device comprising a stator structure, a plurality of axially spaced circumferentially extending pole pieces, windings carried by the stator structure, said windings when supplied with electric current causing adjacent ones of said pole pieces to assume opposite magnetic polarity, an armature surrounding the stator structure, the armature being of

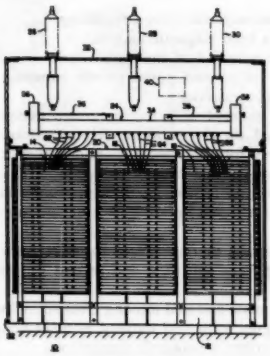
annular form and having on its interval peripheral surface pole pieces complementary to the pole pieces on the stator structure, the pole pieces of the armature and stator structures overlapping each other in the radial direction, said armature being divided axially into at least two parts to enable it to be assembled about the stator structure, an output member coupled to one end of the armature, and a washer secured to the output member, said washer acting to maintain the parts of the armature against inward movement.

4,504,811

CABLE OPERATED TAP CHANGER FOR A THREE-PHASE TRANSFORMER

Joseph M. Stunzi, Athens, Ga., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 12, 1982, Ser. No. 441,134
Int. Cl.³ H01F *33/00*
U.S. Cl. 336—10 **6 Claims**



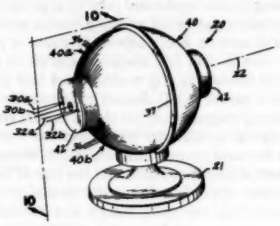
1. An electrical transformer comprising:
an enclosure;
primary and secondary windings in inductive relation with a three-phase magnetic core disposed within the enclosure;
one of the windings in each phase of the transformer having tapped winding sections with tap leads connected thereto for providing different voltages;
tap-changing means including a fixed contact for each tap lead, the fixed contacts for each winding section being disposed in groups and at spaced intervals;
the tap-changing means also including a movable contact carrier having a movable contact for each group of fixed contact;
the movable contact for each group extending between adjacent pairs of spaced fixed contacts;
means for moving the movable contact carrier to effect movement of the movable contacts between different pairs of stationary contacts and including a handle and cable means extending between the handle and the carrier;
the movable contact carrier indlucing an elongated member movable longitudinally between the positions of the movable contacts and including flexible metal parts movable into and out of biased contact with the stationary contacts; and
the cable means having a pair of cables and a spool, one end of each cable being mounted on the spool, and the other end of each cable being secured to said carrier.

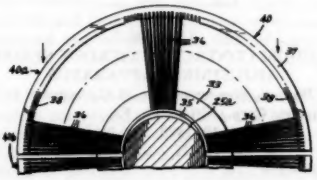
4,504,812

SPHERICAL TRANSFORMER APPARATUS

Donald I. Moermond, deceased, late of Hill City, Minn.; Dennis L. Moermond, personal representative, and Raymond A. Moermond, personal representative, both of P.O. Box 6, Hill City, Minn. 55748

Filed Jun. 7, 1983, Ser. No. 501,795
Int. Cl.³ H01F *15/04*
U.S. Cl. 336—84 C **8 Claims**





1. A transformer comprising: (a) a spherically shaped core having a pole axis passing through the center thereof; (b) a pair of pole members extending along said pole axis forming opposite sides of said core; (c) a primary winding extending between a pair of primary terminals and spirally wound about said axis, on said core, and (d) a secondary winding extending between a pair of secondary terminals and spirally wound about said pole axis and overlying said primary winding; wherein electrical excitation of said primary winding through said pair of primary terminals electromagnetically induces a responsive signal in said secondary winding; (e) a flux intensifier shield defining an internal spherical cavity and configured to overlie and substantially enclose said core and said primary and secondary windings; (f) said shield comprises a pair of hemispherically shaped portions configured to cooperatively operatively engage each other to form a protective spherically shaped shield member overlying said core and said primary and secondary windings; (g) said shield further comprises a plurality of electrically conductive leaf-like members symmetrically arranged and radially extending outward from a central axis; wherein said central axis and said pole axis are coaxial with one another when said shield is operatively positioned to overlie said core and said primary and said secondary windings.

4,504,813

ENERGY SAVING WOUND CORE TRANSFORMER

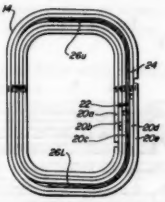
Donald P. Strang, Zanesville, Ohio, assignor to McGraw-Edison Company, Rolling Meadows, Ill.

Filed Dec. 3, 1982, Ser. No. 446,556
Int. Cl.³ H01F *27/24*
U.S. Cl. 336—216 **6 Claims**

1. A magnetic core for a transformer, comprising:
(a) a first strip of magnetic material shaped in a substantially closed loop of one turn so as to define an interior surface and an exterior surface and two abutting ends;
(b) a second strip of magnetic material, generally equal in length to said first strip and wrapped about the exterior surface of said first strip, defining two abutting ends which

are laterally offset from the abutting ends of the first strip; and

(c) a third strip of magnetic material, interleafed between said first strip and said second strip, defining two ends which are substantially spaced apart from one another



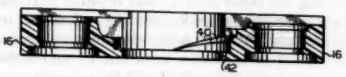
with the abutting ends of said first strip and the abutting ends of said second strip disposed intermediate the ends of said third strip, said third strip having a length such that the transverse thickness of the side of the core thereformed which is opposite the ends of said first strip and said second strip is thinner than the remaining three sides.

4,504,814

HOUSING FOR A BIMETALLIC THERMAL SWITCH

Charles C. Roberts, and Jeffrey R. Wright, both of Frederick, Md., assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 30, 1982, Ser. No. 363,678
Int. Cl.³ H01H *71/16*
U.S. Cl. 337—112 **5 Claims**



1. A thermal switch apparatus which comprises:

a bimetallic element

a housing having means for mounting said bimetallic element in said housing, and for allowing insertion of said bimetallic element in said housing when said thermal switch is fully assembled except for said bimetallic element, said housing comprising a face having an axially extending opening therein, a first slot extending around at least a portion of said face, a second slot extending around at least a portion of said face, said first and second slots intersecting for a portion thereof, said first slot having a first axis and said second slot having a second axis, said first axis and said second axis being disposed in oblique relationship;

first and second electrical contacts; and

means for opening and closing said first and second electric contracts responsive to movement of said bimetallic element.

4,504,815

MINIATURE FUSEHOLDER

Frank A. Harwath, Berwyn, Ill., assignor to Allied Corporation, Morris Township, Morris County, N.J.

Filed Dec. 2, 1982, Ser. No. 446,157
Int. Cl.³ H01H *85/02*
U.S. Cl. 337—201 **9 Claims**

1. A fuseholder for holding and making electrical contact with a tubular fuse element having first and second end ferrules and an insulating body intermediate said first and second end ferrules, comprising:

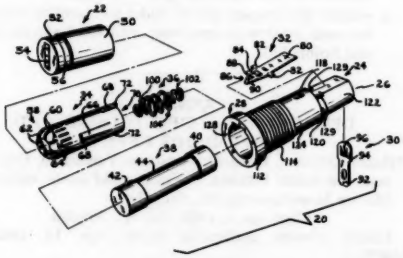
a cap portion;

a body portion having a first closed end and a second open end, said second open end being adapted to receive and removably retain said cap portion;

said body portion including first electrically-conductive contact means adjacent said first closed end for establishing electrical connection to said first end ferrule;

said cap portion including electrically-conductive insert means for establishing electrical connection to said second end ferrule;

said insert means including at least one radial projection adjacent an open end thereof, said insert means further including a radially-projecting tab means adjacent said radial projection;



said body portion including second contact means for establishing electrical connection to said insert means, said second contact means including a terminal portion and a tip portion and defining a notch therebetween;

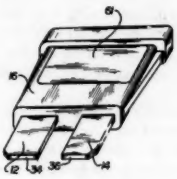
said notch being adapted to receive said radially-projecting tab means of said insert means, said tip portion being adapted to maintain electrical connection between said tip portion and said radial projection of said insert means when said radially-projecting tab means is received in said notch.

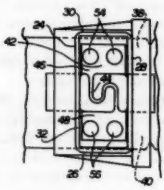
4,504,816

BLADE FUSE AND MANUFACTURING METHOD

Frank J. Viola, Uniondale; Erwin L. Schaub, Manhasset, both of N.Y., and Lawrence H. Burke, Oregon, Ill., assignors to Parker-Hannifin Corporation, Cleveland, Ohio

Filed Oct. 31, 1983, Ser. No. 547,514
Int. Cl.³ H01H *85/16, 85/22*
U.S. Cl. 337—255 **7 Claims**





1. A blade fuse comprising:

two blades having corresponding ends adapted for engagement with an electrical terminal block;

a body having a cavity formed therein and an opening to said cavity with the cavity having a shoulder adjacent the perimeter of said opening, said body securing said blades in parallel relationship with the blade extending through the cavity, the engaging end of said blades extending from said body and the opposite end of said blades located adjacent the surface of said body and exposed from said body;

a fusible link having a fuse element with a heat sink located at each end thereof, said fusible link being positioned in the body cavity transversely between said blades and fastened to said blades by spot welds; and

a window that engages the shoulder surrounding said opening, said window cooperating with the body to enclose said fusible link.

4,504,817
DEMAGNETIZING CIRCUIT USING A PTC THERMISTOR DEVICE

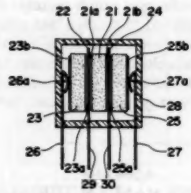
Takashi Shikama, Yokaichi; Tomoyuki Yamamoto, Omihachiman, and Yuichi Takaoka, Yokaichi, all of Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Apr. 5, 1982, Ser. No. 365,480

Claims priority, application Japan, Apr. 13, 1981, 56-53695[U]

Int. Cl.³ H01C *7/02*

U.S. Cl. 338—23 **7 Claims**



1. A PTC thermistor device for use in a demagnetizing circuit, said demagnetizing device comprising:

a first PTC thermistor having first and second flat faces;

first and second terminal plates held in contact with said first and second faces of the first PTC thermistor, respectively, said first and second terminal plates including leg portions adapted to be connected across an A.C. power source;

a second PTC thermistor having first and second flat faces, said first flat face of the second PTC thermistor being held in contact with said first terminal plate such that the first terminal plate is sandwiched between the first and second PTC thermistors;

a third PTC thermistor having first and second flat faces, said first flat face of the third PTC thermistor being held in contact with said second terminal plate such that the second terminal plate is sandwiched between the first and third PTC thermistors;

a first lead terminal member connected to said second flat face of said second PTC thermistor;

a second lead terminal member connected to said second flat face of said third PTC thermistor, said first and second lead terminal members adapted to be connected to respective ends of a demagnetizing coil;

means for holding said first, second, third PTC thermistors and said first and second terminal plates together with said second and third thermistors sandwiching said first thermistor, said holding means including respective spring means formed at the end of each of said first and second lead terminal members; and

a casing which houses said thermistors, said terminal plates, said terminal members and said spring means.

4,504,818
SLIDE RHEOSTAT

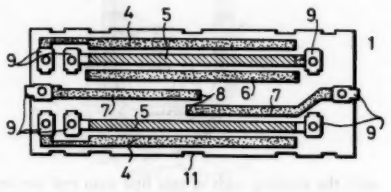
Tsutae Okuya, Miyagi, and Yoshiyuki Ito, Wakuya, both of Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan

Filed Aug. 30, 1983, Ser. No. 527,661

Claims priority, application Japan, Aug. 30, 1982, 57-129638[U]

Int. Cl.³ H01C *10/38*

U.S. Cl. 338—119 **9 Claims**



6. In a variable resistor having a slide movable longitudinally along a substrate carrying a resistive portion for varying resistance between output terminals of said variable resistor and carrying two light-emitting devices each adapted to emit light during movement of said slider along respective portions of said resistive portion, a common collector connected to each of said light-emitting devices through said slider, and means including respective portions of a power supply line connected to each of said light-emitting devices through a respective contact of said slider for supplying current to one of said light-emitting devices during movement of said slider along one area of said resistive portion and supplying current to the other of said light emitting devices during movement of said slider during the other area of said resistive portion, the improvement including means for assuring both of said respective contacts are held in contact with said power supply line as said slider is moved in transition from one of said areas of said resistive portion to the other of said areas to activate both of said light-emitting devices during said transition.

4,504,819
ALARM SYSTEM FOR SIGNALING HARMFUL DROPS IN OR LOW LEVELS OF ENGINE OIL PRESSURE

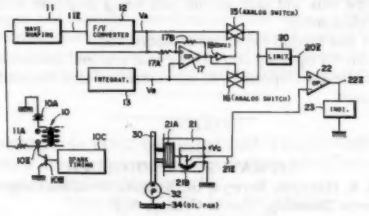
Katsumi Hosoya, Yokohama, Japan, assignor to Nissan Motor Company, Limited, Japan

Filed Sep. 29, 1982, Ser. No. 428,224

Claims priority, application Japan, Nov. 4, 1981, 56-176744

Int. Cl.³ F01M *1/00*; G08B *21/00*

U.S. Cl. 340—60 **12 Claims**



1. An alarm system applied to engine oil pressure dependent on engine speed, comprising:

(a) means for sensing the engine oil pressure and generating a signal indicative thereof;

(b) means for sensing the engine speed and generating a signal indicative thereof;

(c) means, responsive to the engine speed signal, for generat-

ing a reference signal defining an oil pressure reference level as a function of the engine speed, said function selected to match a second function representing normal dependence of oil pressure on engine speed; and

(d) means, responsive to the oil pressure signal and the reference signal, for comparing the engine oil pressure with the reference level and generating an alarm signal when the engine oil pressure is lower than the reference level, wherein:

the engine speed signal has a voltage which increases with the engine speed; and

the reference signal generating means includes a first means for essentially integrating the engine speed signal to produce an integrated voltage signal, a second means for comparing the voltage of the engine speed signal to that of the integrated voltage signal, and a third means for conducting the engine speed signal to the oil-pressure/reference-level comparing means as a reference signal when the voltage of the engine speed signal is equal to or lower than that of the integrated voltage signal and conducting the integrated voltage signal to the oil-pressure/reference-level comparing means as a reference signal when the voltage of the engine speed signal is greater than that of the integrated voltage signal.

4,504,820

FLASHER UNIT

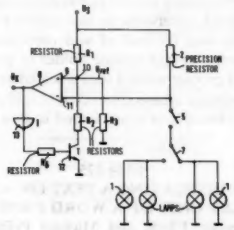
Gerhard Krumrein, Neuenstadt, Fed. Rep. of Germany, assignor to Telefunken Electronic GmbH, Heilbronn, Fed. Rep. of Germany

Filed Apr. 28, 1982, Ser. No. 373,035

Claims priority, application Fed. Rep. of Germany, May 8, 1981, 3118240

Int. Cl.³ B60Q *1/38*; G08B *5/38*

U.S. Cl. 340—81 R **12 Claims**



1. A flasher unit with flasher lamps connected to receive a current to illuminate said lamps, a comparator, a pulse generator connected to receive the output signal from said comparator in order to produce the flash frequency signal, means supplying a reference voltage to one input of said comparator means supplying a voltage, which depends on the current passing through the flasher lamps, to the other input of the comparator, said comparator having an output which produces an output signal representative of the difference between the voltage at said comparator inputs, and a switch element connected for changing the reference voltage in accordance with the output signal from the comparator, said switch element being connected between said one input and said output of said comparator, so that a comparator output signal appears at the output of the comparator for the entire light up time of said lamps.

4,504,821

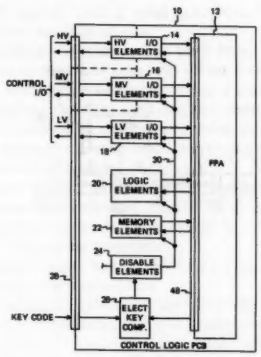
INTEGRATED CIRCUIT BOARD SYSTEM AND AN INTEGRATED CIRCUIT BOARD ASSEMBLY FOR APPLICATION THERETO

Richard A. Barnes, Volusia, Fla., assignor to General Electric Company, Syracuse, N.Y.

Filed Jan. 15, 1982, Ser. No. 339,745

Int. Cl.³ H05K *5/00*

U.S. Cl. 340—146.2 **7 Claims**



1. In a system requiring multiple integrated circuit boards and having a panel providing a plurality of multiple contact connectors at a plurality of locations, each location requiring a unique combination of functions from the integrated circuit board cnnected thereto, an integrated circuit board assembly for use therewith comprising:

A. a first integrated circuit board comprising

1. a first multiple contact connector engageable with said multiple contact connectors at any one of a plurality of locations on said panel,

2. a plurality of active integrated circuit elements disposed thereon having available all functional requirements of plurality of said panel locations; the functional requirement of a specific location being met by selective use of certain of said active circuit elements, and

3. a second multiple connector disposed thereon connected to all of said integrated circuit elements, and

B. a second passive circuit board designed for use in a specific panel location, having

1. a third multiple contact connector for connection to said second multiple contact connector on said first board, and

2. a connection pattern disposed thereon, said connection pattern selectively connecting certain of said active circuit elements in accordance with the requirements of a specific panel location.

4,504,822

ELECTRIC FIELD CHANGE SENSOR EMPLOYING MAINS WIRING AS THE TRANSMITTING ANTENNA

Josif Goizman, 5455 Terrebonne Ave., Apt. 204, Montreal, Quebec, Canada

Filed Dec. 29, 1981, Ser. No. 335,380

Int. Cl.³ G08B *13/26*

U.S. Cl. 340—561 **21 Claims**

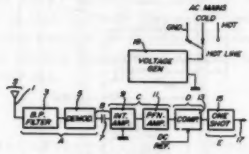
1. A system for recognizing the intrusion of a conductive or semi-conductive object into an area, said area having a mains wiring by detecting changes in an ambient electric field, said system comprising;

transmitter means comprising a transmitting antenna for establishing said electric field; and

receiver means, having a ground (minus DC) for monitoring said field and for detecting changes therein;

said transmitter means being adapted to be connected to said mains wiring whereby said mains wiring comprises the transmitting antenna of said system;

said mains wiring having a cold line, a hot line and a ground line, and wherein said system has a ground, said transmitter means including:



voltage generator means having a hot line and a cold line;

the hot line of said voltage generator means being fed to the ground line of said mains;

the cold line of said voltage generator means being fed to the ground of said receiver means.

4,504,823

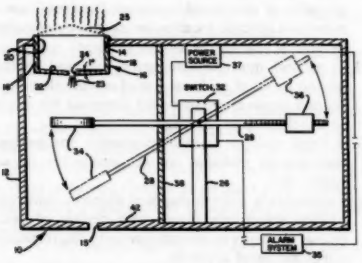
HEAVY RAIN RATE WARNING INDICATOR

Robert O. Berthel, 94 Londonderry Rd., Wendham, N.H. 03087

Filed Apr. 12, 1983, Ser. No. 484,389

Int. Cl.[3] G08B *21/00*

U.S. Cl. 340—602 **7 Claims**



1. A heavy rain rate warning indicator comprising:

a housing, said housing having a first opening at the top thereof and a second opening at the bottom thereof;

means situated within said first opening for collecting rain and directing a stream of rain water therethrough, said collecting and directing means having straight sidewalls, an open top surface, a port centrally located at the bottom thereof, and a slightly inclined bottom surface adjacent said port, said surface being inclined at approximately 1° or less from the horizontal;

means operably associated with said collecting and directing means for receiving said stream of rain water and providing a signal indicative of a predetermined amount of force of said rain water, said liquid receiving and signal providing means including a support, a rod pivotally mounted on said support, a flat plate being secured adjacent one end of said rod and positioned juxtaposed said port in said collecting and directing means, means associated with the other end of said rod for regulating the amount of force necessary to move said rod, and a switch operably connected to said rod capable of being activated by a predetermined movement of said rod and said flat plate in order to provide said signal indicative of said predetermined amount of force of rain water striking said flat plate; and

means operably connected to said switch for receiving said signal indicative of said predetermined amount of said force of rain water and providing an alarm;

whereby said alarm provides a warning indication of heavy or severe localized concentrations of rainfall.

4,504,824

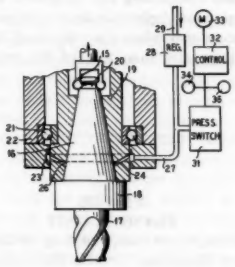
TOOL DETECTION SYSTEM

William R. Mello, Huntington Beach, Calif., assignor to Houdaille Industries, Inc., Ft. Lauderdale, Fla.

Filed Nov. 17, 1982, Ser. No. 442,357

Int. Cl.[3] B23B *49/00*

U.S. Cl. 340—680 **5 Claims**



1. Means for detecting the presence of a tool in a spindle comprising, a stationary spindle holder formed with a groove, a rotatable spindle supported by said spindle holder and formed with at least one passageway which mates with said groove, said spindle formed with a tapered opening and said passageway terminating in said tapered opening, a tool with a tapered tool shank receivable in said tapered opening of said spindle so as to seal the end of said passageway, a pressure conduit connected to said spindle holder to provide a suitable pressure in said groove when a tool is seated in the spindle, and a pressure responsive means connected to said pressure conduit and actuated when a tool is not seated in said spindle.

4,504,825

METHOD OF DISPLAYING A TEXT ON A SINGLE-LINE DISPLAY UNIT OF A WORD PROCESSOR

Franz Bergermann, Fürth, and Michael Prüfer, Cadolzburg, both of Fed. Rep. of Germany, assignors to Triumph-Adler A.G. fur Buro und Informationstechnik, Nuremberg, Fed. Rep. of Germany

Filed Nov. 1, 1982, Ser. No. 437,902

Claims priority, application Fed. Rep. of Germany, Mar. 13, 1982, 3209187

Int. Cl.[3] G09G *3/00*

U.S. Cl. 340—709 **3 Claims**

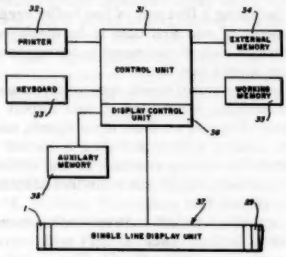
1. In a word processor having a working memory for storing symbols representing text characters and word processor functions, a multi-position line display unit, a display control unit to effect the display of text stored in said working memory on said display unit and the display of a cursor to identify the display position to be processed, and an auxiliary memory for storing symbols representing the meaning of said function symbols which require explanation, a method for displaying the meaning of function symbols comprising the steps of,

displaying said symbols representing text characters and

word processor functions in respective single display positions on said line display unit,

determining if the current display position identified by said cursor displays a function symbol,

determining if an identified function symbol is one of those function symbols which requires explanation,



operating the display control unit to suppress the symbols displayed in a number of display positions sufficient to display the meaning of the cursor identified function symbol requiring explanation, and

displaying instead the stored symbols representing the meaning of the function symbol in said suppressed display positions.

4,504,826

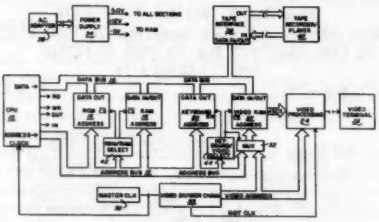
APPARATUS FOR ALPHA-NUMERIC/GRAPHIC DISPLAY

Steven Leininger, Arlington, Tex., assignor to Tandy Corporation, Fort Worth, Tex.

Division of Ser. No. 261,976, May 8, 1981, Pat. No. 4,430,649, which is a continuation of Ser. No. 926,957, Jul. 21, 1978, abandoned. This application Sep. 3, 1982, Ser. No. 414,780

Int. Cl.³ G09G *1/14*

U.S. Cl. 340—721 **10 Claims**



1. A system for generating and displaying characters on a video display means, comprising;

video memory means for storing codes a portion of each of which is representative of the character that is to be displayed represented as a character code and a portion of each of which is representative of character type as to being one of alpha-numeric and graphic type identified as a type code,

a first data latch,

means coupling the character code from the video memory means to the first data latch,

timing means including means for generating timing control signals including at least first and second control signals and line address signals,

means coupling the first control signal to the first data latch for controlling the latching of the character codes from the video memory means to the first data latch, a second data latch connected to the timing means and video memory means for storing control signals including at least said type code,

a character generator having input character code lines, input address lines and output dot lines,

means coupling the character code from the first data latch to the input character code lines of the character generator,

means coupling the line address signals to the input address lines of the character generator,

a first shift register having input data lines, an output line, and at least one control line,

means coupling the output dot lines from the character generator to the input data lines of the first shift register,

means for providing a composite video signal,

means coupling the first shift register output line to the means for providing a composite video signal,

a graphic generator having input character code lines, input address lines and output dot lines,

means coupling the character code from the first data latch to the input character code lines of the graphic generator,

means coupling the line address signals to the input address lines of the graphic generator,

a second shift register having input data lines, an output line, and at least one control line,

means coupling the output dot lines from the graphic generator to the input data lines of the second shift register,

means coupling the second shift register output line to the means for providing a composite video signal,

first gate means having a plurality of input lines and an output line which couples to the control line of the first shift register for controlling the inputting of data into the first shift register,

second gate means having a plurality of input lines and an output line which couples to the control line of the second shift register for controlling the inputting of data into the second shift register,

means applying a clock signal in common to an input line of both first and second gate means,

said second data latch including bistable means responsive to said type code for establishing mutually opposite first and second select signals,

means coupling the first select signal to another input of only the first gate means to enable clocking of the first shift register when the type code indicates alpha-numeric display,

and means coupling the second select signal to another input of only the second gate means to enable clocking of the second shift register when the type code indicates graphic display.

4,504,827

SYNTHETIC PERSISTENCE FOR RASTER SCAN DISPLAYS

David G. Hanson, Spring Lake Park, Minn., and Robert E. Francis, Quito, Ecuador, assignors to Sperry Corporation, New York, N.Y.

Filed Sep. 27, 1982, Ser. No. 424,734

Int. Cl.³ G09G *1/16*

U.S. Cl. 340—723 **3 Claims**

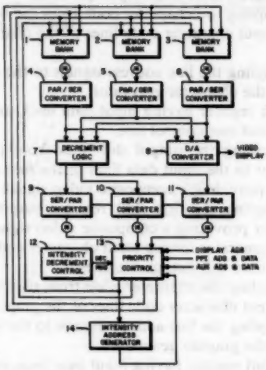
1. An improved display system having apparatus for periodically refreshing images displayed on the screen, wherein the improvement comprises:

refresh control means for reading each of successive addresses, and accompanying data thereto, said data representing intensity of a display image, from an image memory during display refresh operations;

data decrementation means for decrementing the data from said refresh operations, producing by said decrementing decremented data representing a display image of reduced intensity to that said display image which was represented by said data prior to decrementation;

pseudorandom selection means for pseudorandomly select-

ing certain ones of said successive addresses as pseudorandomly selected addresses; and



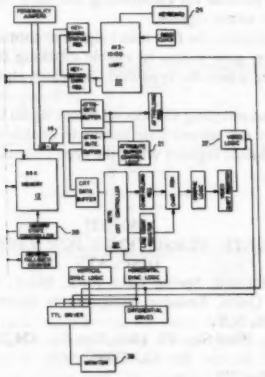
restoration means for writing said decremented data which was produced from the data accompanying said pseudorandomly selected addresses back into said image memory at said pseudorandomly selected addresses.

4,504,828

EXTERNAL ATTRIBUTE LOGIC FOR USE IN A WORD PROCESSING SYSTEM

Robert A. Couper, Sunnyvale; Terrance L. Lillie, Palo Alto, and Kiyoshi Sera, San Jose, all of Calif., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Aug. 9, 1982, Ser. No. 406,654
Int. Cl.³ G09G *1/24*
U.S. Cl. 340—735 **5 Claims**



1. A circuit for controlling attributes of a plurality of characters on a display, comprising:

(a) a processor for controlling the transfer of data associated with characters to be displayed, said associated data consisting of first data including elements defining said characters ordered in accordance with the positions of said characters on said display and second data in one-to-one correspondence with said first data, each element of said second data defining predetermined attributes for its associated character;

(b) a memory operatively connected to said processor for storing said data;

(c) communications means responsive to said processor and operatively connected to said memory for transferring said data from said memory;

(d) display control means, responsive to said processor and operatively connected to said communications means for controlling the display of characters on said display in one-to-one correspondence with the elements of said first data, and for controlling the attributes of said characters in accordance with attribute input signals, said display control means including a first pair of line buffer registers for storing elements of said first data to be displayed as respective alternate lines of characters in correspondence to said elements of said first data;

(e) external attribute control means operatively connected to said communications means and to said display control means for providing said attribute input signals, said external attribute control means including a second pair of buffer registers for storing elements of said second data, each member of said second pair of buffers corresponding to a member of said first pair;

(f) synchronizing means for alternately reading members of said first pair of buffers synchronously with corresponding members of said second pair of buffers to define alternate lines of said characters and corresponding attributes to be displayed; and,

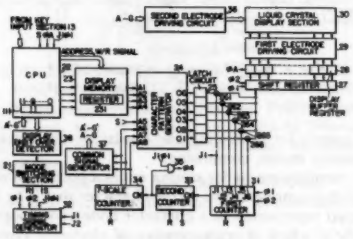
(g) said processor controlling said display control means, said external attribute control means and said synchronizing means to alternately and synchronously output one of said first buffers and the corresponding one of said second buffers to define a line of said characters and corresponding attributes to be displayed in accordance with the elements of said first data and of said second data stored in said first and second buffers being output, and, substantially simultaneously, inputting other elements of said first and second data into the other members of said first and second pairs of buffers to define the next succeeding line of characters and corresponding attributes to be displayed.

4,504,829

ELECTRONIC EQUIPMENT

Minoru Usui, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Dec. 8, 1981, Ser. No. 328,474
Claims priority, application Japan, Dec. 16, 1980, 55-177511; Dec. 16, 1980, 55-177513; Dec. 16, 1980, 55-177516
Int. Cl.³ G09G *3/36*
U.S. Cl. 340—756 **5 Claims**



1. Electronic equipment comprising:

memory means for storing input data to be displayed;

character pattern signal generating means including first and second sets of character patterns and coupled to said memory means, for generating a selected one of first and second character pattern signals each corresponding to the input data to be displayed in response to a corresponding mode signal;

display means including a display section in which a plurality of dot display elements are aligned in a matrix form, for displaying the data which is stored in said memory means

in response to the selected character pattern signal from said character pattern signal generating means;

mode signal generating means for generating different first and second mode signals in response to a detected display mode of the data to be displayed by said display means; and

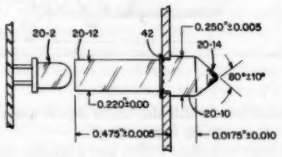
display control means including selecting means for selecting one of said first and said second character patterns in response to said detected display mode, for displaying the data which is stored in said memory means in n characters in response to the first mode signal which is generated by said mode signal generating means, and for displaying the data which is stored in said memory means in m characters ($n<m$) in response to the second mode signal.

4,504,830

DISPLAY APPARATUS FOR FACILITATING MAINTENANCE OF COMPUTER EQUIPMENT

Robert M. Boehme, Worcester, Mass., assignor to Honeywell Information Systems Inc., Waltham, Mass.

Filed Feb. 16, 1982, Ser. No. 349,428
Int. Cl.³ G08B 5/36
U.S. Cl. 340—815.31 **27 Claims**



1. Indicator apparatus for use with computer equipment including at least one signal point internal to said equipment which is to be monitored and displayed at a corresponding indicator position internal to said equipment, said indicator apparatus comprising:

light emitting diode means coupled to said one signal point for converting low level signals appearing at said signal point into unconcentrated low intensity light signals;

transparent rod means, one of said ends of said rod means being coupled to said light emitting diode means and the other end of said rod means having a predetermined conical shape for concentrating said low intensity light signals applied to said one end by said light emitting diode means and transmitted axially by said rod means into a sharply defined cone; and,

means for mounting said transparent rod means at a predetermined point within said computer equipment at said indicator position so that a portion of said transparent rod means including said other end is completely unobstructed by said equipment for viewing said sharply defined cone at long distances notwithstanding the viewing angle for determining the state of said low level signals appearing at the signal point.

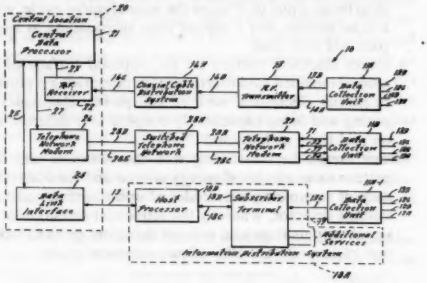
4,504,831

UTILITY USAGE DATA AND EVENT DATA ACQUISITION SYSTEM

Ronald S. Jahr, Naperville, Ill., and Thomas H. Cowell, Corunna, Mich., assignors to Systems and Support, Incorporated, Owosso, Mich.

Filed Oct. 9, 1981, Ser. No. 310,054
Int. Cl.³ G08C 19/00, 19/04, 19/10
U.S. Cl. 340—870.03 **4 Claims**

1. A utility usage data and event data acquisition system comprising, in combination, data acquisition means for automatically acquiring input serial data from a plurality of external sources having differing drive signal requirements, said data acquisition means including means for reformatting said acquired data and appending a code to said acquired data, means for transmitting a composite serial data message comprising said acquired data and said code to a central location, means for initiating the transmission of said composite serial



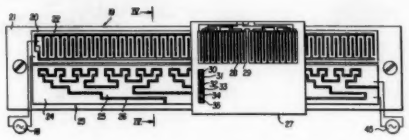
data messages, a primary power supply, means for connecting said power supply to said data acquisition means, and means for initiating transmission of a composite data message upon interruption of power to said data acquisition means.

4,504,832

ABSOLUTE PRECISION TRANSDUCER FOR LINEAR OR ANGULAR POSITION MEASUREMENTS

Alberto Conte, Turin, Italy, assignor to Selca S.p.A., Ivrea, Italy

Continuation of Ser. No. 905,661, May 15, 1978, abandoned.
This application Feb. 28, 1980, Ser. No. 125,432
Claims priority, application Italy, May 18, 1977, 68123 A/77
The portion of the term of this patent subsequent to Nov. 12, 2000, has been disclaimed.
Int. Cl.³ G08C 19/10, 19/06
U.S. Cl. 340—870.37 **2 Claims**



1. A position measuring transducer comprising:

first and second relatively movable members having mutually spaced, opposed surfaces;

a first electrical conductor pattern on the opposed surface of said first member, said first pattern comprising a plurality of uniformly spaced conductors positioned perpendicularly to the path of relative motion of said members; the spacing of said conductors defining a measurement cycle;

at least one second electrical conductor pattern on the opposed surface of said second member, said second pattern comprising a plurality of uniformly spaced conductors positioned perpendicularly to the path of relative motion of said members, said second pattern having substantially the same spacing as said first pattern, and being inductively coupled to said first pattern;

electrical circuit means for connecting an alternating source of electrical voltage to one of said first and second patterns and for connecting a voltage detector to the other of said first and second patterns, whereby the voltage detector gives an indication of the relative position of said two members within a measurement cycle;

a third electrical conductor pattern on the opposed surface of said first member, said third pattern comprising two zones separated by a nonconductive space, a first zone having a plurality of electrically connected strips running parallel to the path of relative motion of said members,

each of said strips having uniformly spaced finger portions, a first strip having finger portions of one measurement cycle width and separated by one measurement cycle width, the remaining strips having finger portions and spaces of equal widths, the widths for each remaining strip being equal to 2^n times the measurement cycle, where n is an integer, and a second zone surrounding at least in part said first zone;

a fourth electrical pattern on the opposed surface of said second member, said fourth pattern comprising a plurality of pickup electrodes, each of said pickup electrodes opposing and being capacitively coupled to a different strip on said third pattern; and

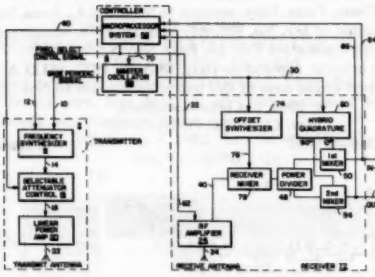
circuit means for connecting said two zones of said third pattern to an electrical energy source and for connecting each of said pickup electrodes of said fourth pattern to a voltage detector, whereby the sequential detection of the signal outputs from said voltage detectors gives an indication of one of a plurality of measurement cycles.

4,504,833

SYNTHETIC PULSE RADAR SYSTEM AND METHOD

James C. Fowler, Burke; Howard S. Wheatley, Alexandria, and John L. Davis, Fairfax, all of Va., assignors to Xadar Corporation, Springfield, Va.

Filed Dec. 9, 1981, Ser. No. 329,042
Int. Cl.³ G01S 7/28, 7/32
U.S. Cl. 343—5 NA **18 Claims**



1. A synthetic pulse radar for detecting geophysical phenomena comprising:

(a) A transmitter means for approximating at least a portion of a Fourier transform of a radar short pulse suitable for transmission toward and modulation by a geophysical target by generaing a plurality of periodic component signals each of which has a uniquely discrete frequency,

(b) controller means for providing a base periodic signal of a single frequency, and

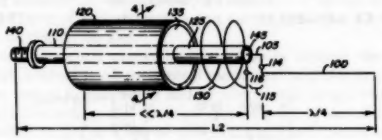
(c) receiver means for recovering representative parameters of each said periodic component signal which has been modulated by the geophysical phenomena being measured, said receiver means including an offset frequency synthesizer means for generating a reference signal having a frequency corresponding to the original frequency of the corresponding periodic component signal transmitted by said transmitter means, said offset frequency synthesizer means being connected to receive said base periodic signal and operating to multiply the base periodic signal by each one of a series of integers, said controller means operating to provide a digital signal representative of each said integer by which the base periodic signal is to be multiplied to said offset frequency synthesizer means, means for recovering each said modulated periodic component signal, receiver mixing means for mixing each said recovered modulated periodic component signal with said reference signal to produce a parameter signal, a quadrature circuit means for producing an in-phase reference signal of a single frequency and a quadrature reference signal of said single frequency having a 90° phase shift relative to the in-phase reference signal, a first mixer circuit means for mixing said in-phase reference signal with the parameter signal from said receiver mixing means to produce an in-phase component of said parameter signal, and second mixer circuit means for mixing said quadrature reference signal with the parameter signal from said receiver mixing means to produce a quadrature component of said parameter signal.

4,504,834

COAXIAL DIPOLE ANTENNA WITH EXTENDED EFFECTIVE APERTURE

Oscar M. Garay, N. Lauderdale; Kazimierz Siwiak, Sunrise, and Quirino Balzano, Plantation, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 22, 1982, Ser. No. 452,167
Int. Cl.³ H01Q 9/16
U.S. Cl. 343—749 **14 Claims**



1. A wide bandwidth shortened dipole antenna for use with portable transceivers, comprising:

a feed port including a first and a second input terminal;

a first radiator coupled at one end to said first input terminal and extending outward from said feed port in a first direction, said first radiator exhibiting electrical length of approximately one quarter of a predetermined wavelength;

a sleeve radiator extending outward from said feed port in a direction substantially diametrically opposed to said first direction and exhibiting electrical length less than one quarter of said wavelength;

a conductor physically longer than said sleeve radiator with a portion of said conductor disposed within said sleeve radiator, said conductor being electrically attached to said second input terminal, said conductor having a predetermined capacitance between said conductor and said sleeve radiator for extending the antenna's effective radiating aperture by exciting in-phase radiation by said conductor; and

a reactive element coupling the end of said sleeve radiator closest to said feed port with said second input terminal, and having an electrical reactance sufficient to increase the electrical length of said sleeve radiator to one quarter of said wavelength.

4,504,835

LOW SIDELOBE, HIGH EFFICIENCY MIRROR ANTENNA WITH TWIST REFLECTOR

Dean D. Howard, Fort Washington, Md., and David C. Cross, Alexandria, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 15, 1982, Ser. No. 389,139
Int. Cl.³ H01Q 19/00
U.S. Cl. 343—755 **5 Claims**

1. A low sidelobe, high efficiency, mirror antenna comprising:

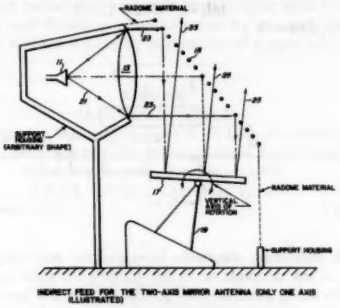
a feed horn for forming a linearly-polarized divergent beam of radiofrequency energy;

an electromagnetic lens disposed in the path of the linearly polarized divergent beam from the feed horn for simultaneously refracting and collimating the radiofrequency

energy in the beam to produce a linearly-polarized collimated beam;

a polarized reflector disposed in fixed spatial relationship to the electromagnetic lens for reflecting the linearly-polarized collimated beam of radiofrequency energy; and

a twist reflector having a continuous reflecting surface and rotatably mounted about two mutually perpendicular axes



INDIRECT FEED FOR THE TWO-AXIS MIRROR ANTENNA (ONLY ONE AXIS ILLUSTRATED)

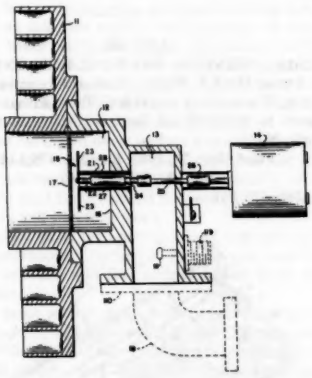
in the path of the reflected linearly-polarized collimated beam for changing the direction of the linearly-polarized collimated beam of radiofrequency energy in accordance with the position of the twist reflector and for twisting the polarization of the radiofrequency energy in the collimated beam by substantially 90° so that if the beam is directed back toward the polarized reflector, the beam passes through the polarized reflector to free space.

4,504,836

ANTENNA FEEDING WITH SELECTIVELY CONTROLLED POLARIZATION

John M. Seavey, Cohasset, Mass., assignor to Seavey Engineering Associates, Inc., Cohasset, Mass.

Filed Jun. 1, 1982, Ser. No. 383,822
Int. Cl.³ H01Q *13/02*
U.S. Cl. 343—761 **12 Claims**



1. In an antenna feed having a corrugated surface concentric about the axis of an adjacent circular waveguide having an open end and a closed end formed with a central opening the improvement comprising,

polarized dipole antenna means polarized in a predetermined direction rotatably mounted about said axis and coupled to said circular waveguide and spaced from the circular waveguide closed end,

means for rotatably supporting said antenna means for rotation about said axis,

an output waveguide means for exchanging energy with said dipole antenna means through said central opening,

means for coupling said dipole antenna means to said output waveguide means through said central opening comprising an insulating mechanical bearing sleeve seated in said central opening and a coaxial transmission line seated in said sleeve connected to said dipole antenna means and including a coaxial impedance transformer for improving the impedance match between said dipole antenna means and said output waveguide means,

and means for rotating the assembly comprising said coaxial transmission line and said dipole antenna means to selectively control the polarization of said antenna feed about said axis,

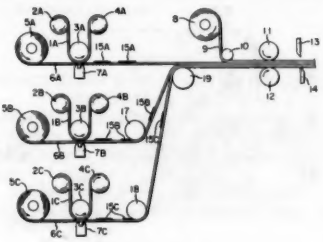
wherein the axial length of said central opening is substantially a quarter wavelength, said dipole antenna means includes at least one pair of arms each substantially a quarter wavelength long extending radially outward from said axis, and the distance between said arms and said closed end is substantially a quarter wavelength.

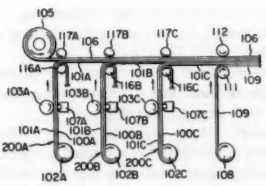
4,504,837

METHOD AND APPARATUS FOR RECORDING COLOR IMAGES AS COLOR TRANSFER SUPERIMPOSED LAMINATIONS

Kenji Toyoda, Chigasaki; Kaoru Naito, Yokohama, and Norio Yamamura, Kawasaki, all of Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Filed Jul. 6, 1982, Ser. No. 395,241
Claims priority, application Japan, Jul. 14, 1981, 56-109862; Oct. 28, 1981, 56-172426
Int. Cl.³ G01D *15/16*; B44C *1/16*; B32B *7/14*; G01D *15/10*
U.S. Cl. 346—1.1 **8 Claims**





8. An apparatus for forming a two-dimensional multi-color image on a base sheet, comprising:

(a) recording head means for generating a first picture signal representative of a first color monochromatic image component of said multi-color image, a second picture signal representative of a second color monochromatic image component of said multi-color image and a third picture signal representative of a third color monochromatic image component of said multi-color image;

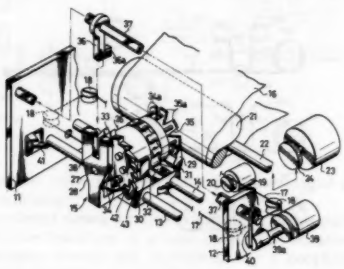
(b) a first, a second and a third film, at least two of which are transparent;
(c) means for respectively moving said first, second and third films in synchronism and relative to said recording head means;
(d) means for reproducing said first monochromatic image on said first film in accordance with said first picture signal from said recording head means;
(e) means for reproducing said second monochromatic image on said second film in accordance with said second picture signal from said recording head means;
(f) means for reproducing said third monochromatic image on said third film in accordance with said third picture signal from said recording head means, said third monochromatic image being reproduced on one surface of said third film; and
(g) means for bonding one surface of said first film to said base sheet, one surface of said second film to the other surface of said first film and said one surface of said third film to the other surface of said second film, respectively, with said monochromatic images registered to form said multi-color image in a laminated structure.

4,504,838

MULTI-COLOR PEN RECORDER

Hideo Tamai, Morioka, and Kyuichi Fujisawa, Tonan, both of Japan, assignors to Alps Electric Co., Ltd., Japan

Continuation of Ser. No. 325,293, Nov. 27, 1981, abandoned.
This application Jul. 11, 1983, Ser. No. 513,128
Claims priority, application Japan, Nov. 27, 1980, 55/166974
Int. Cl.³ G01D *9/38*
U.S. Cl. 346—46 **18 Claims**



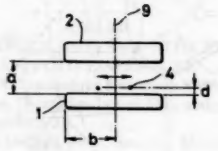
1. A multi-color pen recorder comprising:
(a) frame means for mounting the various portions of the recorder;
(b) means mounted on the frame for moving a recording paper in one direction, during recording thereon, in accordance with printing instructions;
(c) a carriage slidably mounted relative to the frame means;
(d) a rotary drum rotatably mounted on the carriage means;
(e) a plurality of pen means for placing visible marks on the recording paper and arranged in said rotary drum circularly about the axis thereof, said pen means being projectable relative to the drum in parallel with the axis of said rotary drum;
(f) means for sliding said carriage transversely of the direction of said movement of said recording paper in accordance with printing instructions;
(g) means for rotating said rotary drum to bring a selected one of said pen means to a marking position; and
(h) pen projecting means adapted to press and project only said pen means positioned at the marking position.

4,504,839

DEFLECTING ELECTRODE ASSEMBLY FOR MULTI-NOZZLE INK JETS

Tetsuo Iyoda, and Masayoshi Tamai, both of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 390,430, Jun. 21, 1982, abandoned.
This application Jul. 23, 1984, Ser. No. 633,665
Claims priority, application Japan, Jul. 24, 1981, 56-115398
Int. Cl.³ G01D *15/18*
U.S. Cl. 346—75 **4 Claims**



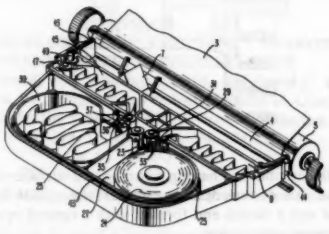
1. A deflecting electrode assembly for deflecting parallel trains of ink droplets in an ink jet printer, each train of ink droplets being generated by an ink jet, said ink jets being disposed in a line so that said train of ink droplets travels in a common plane, thus forming a first plane of ink droplets, comprising:
an upper and a lower deflecting electrode, said deflecting electrodes being equal in width and parallel to one another, a second plane containing said lower deflecting electrode being parallel to said first plane of ink droplets, a longitudinal central line of said lower deflecting electrode in said second plane being parallel to a direction of travel of said trains of ink droplets, a first distance (d) between said first plane of ink droplets and said lower deflecting electrode being: $0.2\ mm \leqq d \leqq 0.4\ mm$, a second distance (b) measured from a central line between an outermost train of ink droplets and a train of ink droplet adjacent thereto to an outer edge of said lower deflecting electrode being at least 5 times a third distance (c) between adjacent trains of ink droplets, said outer edge of said lower deflecting electrode extending past said outermost train of ink droplets, and a fourth distance (a) between said upper and lower electrodes being $1\ mm \leqq a \leqq 2$ mm.

4,504,840

THERMAL PRINTING WITH INK REPLENISHMENT

Julie F. Evans; Hugh T. Findlay, both of Lexington; Stephen A. Popyach, Harrodsburg, and Deh C. Tao, Lexington, all of Ky., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 28, 1983, Ser. No. 479,614
Int. Cl.³ G01D *15/10*
U.S. Cl. 346—76 PH **22 Claims**



1. A thermal printer for printing from an ink which is heated to a flowable state to effect printing, said printer having a continuous band to apply heat to effect said flowable state on

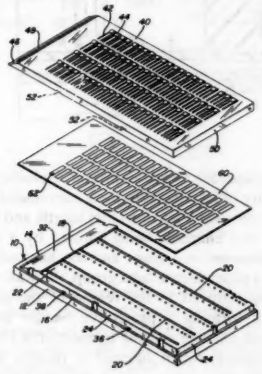
selected area of said ink, a print station to generate said heat in selectable patterns to effect printing, an ink supply separate from said band having said ink in a lamination folded on itself to be unfolded as said lamination is supplied for printing, means to supply said ink by transporting said ink into heat conductive relationship with said band for printing in any of said patterns at said print station; and means to effect printing in selected ones of said patterns at said print station from said band by producing said flowable state followed by resupply to said band from said ink supply by said means to supply said ink.

4,504,841

MARKING DEVICE

Eugene Vignerot, Westminster, and W. S. Law, Englewood, both of Colo., assignors to L. V. J. Corporation, Englewood, Colo.

Filed Sep. 8, 1982, Ser. No. 415,897
Int. Cl.³ G01D *15/28*; B41J *11/64*
U.S. Cl. 346—104 **6 Claims**



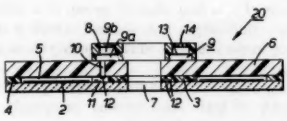
1. A marking device, comprising:
a body having a first surface;
a plurality of embossing punches formed on said first surface, each of said embossing punches extending outwardly away from said first surface, said plurality of embossing punches being positioned on said first surface to define a plurality of rows and columns of embossing punches;
a preprinted card supported on said first surface, said card having a number of listed items, each of said listed items having a marking space adjacent thereto;
a face piece having an outer surface and being connected to said body and overlying substantially all of said first surface of said body and overlying substantially all of said card, said card being located between said first surface of said body and said face piece;
said face piece including opening means, said opening means being continuously opened to receive said card for positioning between said first surface of said body and said face piece;
said face piece including a plurality of movable, resilient keys, each of said keys being formed integral with said outer surface of said face piece to be continuously, fixedly attached thereto, each of said keys including an operating button, each of said operating buttons being aligned with a separate one of said embossing punches, each of said operating buttons extending outwardly away from said outer surface of said face piece and said first surface of said body, each of said operating buttons being of a size to matingly engage a separate one of said embossing punches when said each operating button is moved sufficiently toward said separate one embossing punch with one of said marking spaces therebetween;
said card and said first surface of said body supporting said card being devoid of movement together in order to provide a mark at a desired location on said card;
said face piece and each of said movable, resilient keys including said operating button thereof being free of predetermined indicia for providing information regarding each of said keys including said operating button thereof.

4,504,842

RADIATION-SENSITIVE RECORD DISC

Kazuharu Odawara, Yokohama, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Jan. 24, 1983, Ser. No. 460,584
Claims priority, application Japan, Jan. 29, 1982, 57-12796
Int. Cl.³ G01D *15/32*
U.S. Cl. 346—137 **8 Claims**



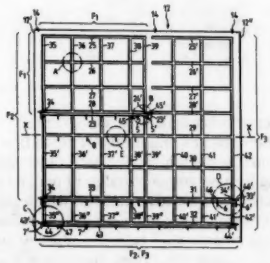
1. A radiation-sensitive record disc, comprising:
a first substrate having a recording layer formed thereon;
a second substrate, having an inner and outer surface, coaxially positioned with said first substrate and adjacent said recording layer to form an air space therebetween; and
a pressure equilibrium means coupled to said air space for equalizing the pressure between said air space and the air surrounding said outer space, wherein said pressure equilibrium means comprises:
a pressure sensitive expansible means having a first surface coupled to said air space and a second surface coupled to said surrounding air for equalizing the pressure on said first and second surfaces.

4,504,843

SURFACE STRUCTURE FOR THE DRUM OF A RECORDING DEVICE

Hans-Rüdiger Pröhl, Radolfzell; Bernd Schmidt, Plochingen, and Hans-Peter Spannehl, Schortens, all of Fed. Rep. of Germany, assignors to Contraves GmbH, Haar, Fed. Rep. of Germany

Filed Jul. 19, 1982, Ser. No. 399,238
Claims priority, application Switzerland, Aug. 26, 1981, 5493/81
Int. Cl.³ G01D *15/34*
U.S. Cl. 346—138 **5 Claims**



1. A drum member for use in a recorder, comprising:
a drum body mounted to be rotatable about its lengthwise axis in the recorder and constructed as a hollow cylinder intended to be subjected to a vacuum;
said drum body having an outer cylindrical circumferential surface for retaining a sheet-like record carrier thereat;

said outer cylindrical circumferential surface of said drum body possessing a clamping portion arranged essentially parallel to the lengthwise axis of the drum body;

a plurality of channels extending substantially parallel to said clamping portion and distributively arranged at the circumferential surface of the drum body;

at least one clamping region for the record carrier arranged at the cylindrical circumferential surface of said drum body;

a closed channel system provided for said clamping region;

said closed channel system comprising a number of channels of a first channel group arranged essentially parallel to one another and extending in the axial lengthwise direction of the drum body;

said closed channel system further comprising a number of channels of a second channel group arranged transversely with respect to the channels of the first channel group;

said channels of said first channel group of a related clamping region including a last channel which is operatively correlated in parallel spaced relationship from said clamping portion;

only said last channel of said first channel group being provided with at least one opening piercingly extending through said drum body; and

the channels of the first channel group arranged in the drum body and the channels of the second channel group arranged in the drum body are sub-divided by mutually parallelly arranged webs and grooves.

4,504,844

INK JET PRINTING APPARATUS

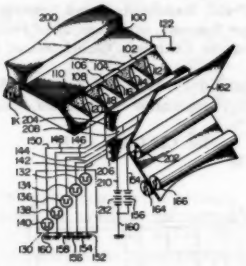
Yutaka Ebi, Kawasaki; Tadashi Fujii; Takuro Sekiya, both of Yokohama; Masanori Horike, Tokyo; Tatsuya Furukawa, Yokohama, and Masaaki Tachiki, Tokyo, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Oct. 12, 1982, Ser. No. 433,929

Claims priority, application Japan, Oct. 20, 1981, 56-167689

Int. Cl.³ G01D *15/16*

U.S. Cl. 346—140 R **18 Claims**



1. An ink jet printing apparatus, comprising:

an ink ejection head having means defining first and second parallel inner walls which face each other, the first inner wall being formed with a plurality of parallel ridges made of an electrically insulative material which extend at least partially toward the second inner wall to define respective ink ejection passageways between adjacent ridges;

a plurality of control electrodes disposed in the respective ink ejection passageways on the first inner wall;

a counter electrode disposed on the second inner wall facing the control electrodes;

means for supplying ink into the ink ejection passageways; and

means for selectively applying an electric voltage between the counter electrode and the individual control electrodes causing ink to be ejected from the respective ink ejection passageways for printing.

4,504,845

PIEZOELECTRIC PRINTING HEAD FOR INK JET PRINTER, AND METHOD

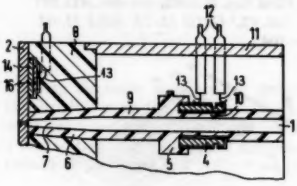
Erich Kattner, Neubiberg, and Kurt Herzog, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Aug. 17, 1983, Ser. No. 523,946

Claims priority, application Fed. Rep. of Germany, Sep. 16, 1982, 3234408

Int. Cl.³ G01D *15/18*

U.S. Cl. 346—140 R **14 Claims**



1. A printing head for an ink jet printer, including, in combination, a plurality of ink channels, each surrounded by a piezoelectric transducer over a portion of its length, and terminating at a jet plate, said channels being formed by a plurality of hollow tubes disposed in a plane and mechanically interconnected to form a piezoelectric tube group, the wall thickness of said tubes being reduced in the region of the piezoelectric transducers and forming a protective barrier between the interior of the ink channel and the transducer, a front housing part having a conical recess adapted to receive and support said piezoelectric tube group, and a housing cap supporting contact elements adapted to make electrical connection with said piezoelectric transducers when said cap is assembled in place.

4,504,846

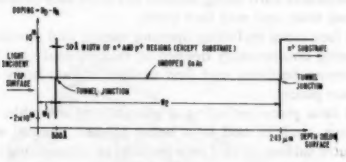
MULTIWAVELENGTH OPTICAL-TO-ELECTRICAL LOGIC OPERATIONS

Terry I. Chappell, Amawalk, and Jerry M. Woodall, Bedford Hills, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 30, 1982, Ser. No. 454,747

Int. Cl.³ H01L *29/88, 27/12, 27/14, 31/00*

U.S. Cl. 357—12 **11 Claims**



1. An optical-to-electrical logic element for providing a logic function signal in response to at least one logic variable signal comprising in combination

at least one monocrystalline semiconductor essentially planar undoped region bounded by a quantum mechanical tunneling junction region having a thickness dimension of the order of the mean free path of a carrier in said tunneling junction region, said undoped region being essentially parallel to a light incident surface and having a thickness

dimension correlated with maximum absorption of light of a particular wavelength,

means delivering at least one light signal of a particular wavelength representing a specific logic variable, and

sensing means for detecting across at least said region and said tunneling junction at least one of an electric current and voltage indicative of a logic function represented by said logic variable representing light means.

4,504,847

STATIC INDUCTION TYPE SEMICONDUCTOR DEVICE

Jun-ichi Nishizawa, Sendai, Japan, assignor to Zaidan Hojin Handotai Kenkyu Shinkokai, Sendai, Japan

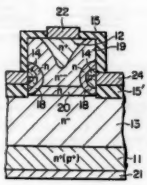
Continuation of Ser. No. 18,774, Mar. 8, 1979, Pat. No. 4,364,072. This application Jun. 8, 1982, Ser. No. 386,313

Claims priority, application Japan, Mar. 17, 1978, 53-31223; Jan. 11, 1979, 54-2378; Jan. 24, 1979, 54-7609

The portion of the term of this patent subsequent to Dec. 14, 1999, has been disclaimed.

Int. Cl.³ H01L *29/80*

U.S. Cl. 357—22 **11 Claims**



1. A static induction type semiconductor device comprising:

first and second current electrode regions, a semiconductor channel region of one conductivity type disposed between said current electrode regions for allowing a current to flow therethrough, at least said first current electrode region being of said one conductivity type and a control electrode region disposed adjacent to said semiconductor channel region for developing into said channel region a depletion layer capable of controllably establishing a potential barrier for the majority carriers of said one conductivity type injected from said first current electrode region, the improvement wherein:

said control electrode region comprises a highly doped semiconductor region having a conductivity type opposite to said one conductivity type;

said semiconductor channel region includes a main channel region of a relatively high resistivity; and

a subsidiary channel region of a relatively low resistivity disposed adjacent to said main channel region between said main channel region and said control electrode region in direct contact with said control electrode region, said subsidiary channel region surrounding at least that portion of said control electrode region which faces the main channel region, said potential barrier being controllably established substantially in said main channel region.

4,504,848

SOLID STATE IMAGE SENSOR WITH OVER-FLOW CONTROL

Hiroyuki Matsumoto, and Toshio Kato, both of Atsugi, Japan, assignors to Sony Corporation, Tokyo, Japan

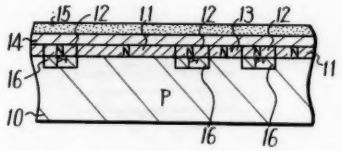
Continuation of Ser. No. 318,559, Nov. 5, 1981,. This application Jun. 5, 1984, Ser. No. 616,800

Claims priority, application Japan, Nov. 10, 1980, 55-157831

Int. Cl.³ H01L *29/78, 27/14, 31/00;* **G11C** *19/28*

U.S. Cl. 357—24 **1 Claim**

1. An electrical charge transfer device comprising a solid state image sensor having a plurality of aligned channel regions, overflow control gate regions and overflow drain regions comprising a substrate of a first conductivity type, said channel regions, said overflow gate control regions and said overflow drain regions comprising material of a second conductivity type and overlying said substrate, and areas of first conductivity type which has a higher impurity concentration than said substrate under said overflow control gate regions, an insulating layer formed over said channel regions, said over-



flow control gate regions and said overflow drain regions, and a transfer gate formed on said insulating layer over said channel regions, said overflow control gate regions and said overflow drain regions for transferring charges and wherein the maximum charge that can be handled during charge transfer mode is greater than the maximum charge during the light receiving mode.

4,504,849

SEMICONDUCTOR DEVICES AND A SOLDER FOR USE IN SUCH DEVICES

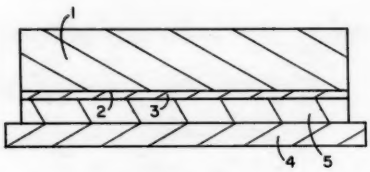
Neil A. Davies, Wednesbury, and Edward T. E. Hughes, Stockport, both of England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 14, 1982, Ser. No. 398,124

Claims priority, application United Kingdom, Jul. 31, 1981, 8123478

Int. Cl.³ H01L *29/48, 29/40, 29/46, 29/62*

U.S. Cl. 357—67 **10 Claims**



1. A semiconductor device comprising a semiconductor body having a metallized contact area soldered to a metallic member with a solder which comprises at least 80% lead, the balance of the solder being substantially all indium and silver, characterized in that the indiun content of the solder is at least four and at most ten times as great as the silver content.

4,504,850

DISC-TYPE SEMICONDUCTOR MOUNTING ARRANGEMENT WITH FORCE DISTRIBUTION SPACER

David D. Pollard, Amanda Township, Allen County, and Ting-Long Ho, Shawnee Township, Allen County, both of Ohio, assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 2, 1981, Ser. No. 308,320

Int. Cl.³ H01L *23/42, 23/16, 23/02, 23/44*

U.S. Cl. 357—79 **6 Claims**

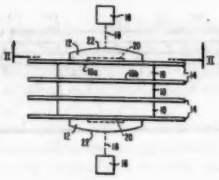
1. A semiconductor device mounting arrangement comprising:

a disc-type semiconductor device having opposing contact faces;

a metal sheet for making electrical and thermal contact with one of said contact faces of said device;

a spacer having a counterbore in one side, said counterbored side being disposed in contact with said metal sheet on the opposite side of said metal sheet as said device;

means for applying a predetermined pressure to force said



device, said metal sheet, and said spacer into intimate contact, with said counterbore having sufficient depth to preclude contact between the center of said counterbore and said metal sheet, when said predetermined pressure is applied, and wherein the forces on the spacer side of said metal sheet are effectively averaged on the device side of said metal sheet; and

means for centering said predetermined pressure on a second side of said spacer.

4,504,851

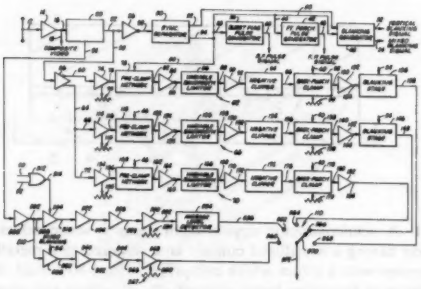
SYSTEM FOR MONITORING VIDEO SIGNAL PARAMETERS, INCLUDING THE LUMINANCE SIGNAL

Mike A. Janko, and David K. Broberg, both of Oklahoma City, Okla., assignors to Precision Electronics, Inc., Oklahoma City, Okla.LAHOMA

Filed Jun. 29, 1983, Ser. No. 508,921

Int. Cl.³ H04N *7/62, 9/62*

U.S. Cl. 358—10 **26 Claims**



1. A method of continuously monitoring selected video parameters of a video signal wherein the video signal includes vertical blanking signals, and wherein the video signal includes at least one of a luminance signal having positive peaks and negative peaks, a chrominance signal having a peak voltage value and combinations thereof, the method comprising the steps of:

inputting said video signal;

determining at least one video parameter of the video signal from a group of video parameters selected from among: (1) an instantaneous peak voltage level of the positive peaks in the luminance signal; (2) an instantaneous peak voltage level of the negative peaks in the luminance signal; (3) the peak voltage value of the chrominance signal; and (4) combinations thereof; whereas each of said video parameters is movingly or randomly located or contained in the video signal outside the vertical blanking signal;

comparing each selected video parameter with a reference DC voltage value selected to correspond with the selected video parameter; and

providing a perceivable output indication of the comparison of each selected video parameter with the reference DC voltage value selected to correspond with the selected video parameter.

4,504,852

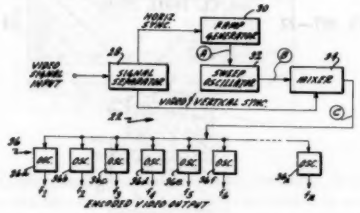
METHOD AND APPARATUS FOR VIDEO STANDARD CONVERSION

Robert P. Ducret, Los Angeles, Calif., assignor to Beehler, Pavitt, Siegemund, Jagger & Martella, Los Angeles, Calif.

Filed Sep. 10, 1982, Ser. No. 416,501

Int. Cl.³ H04N *5/02*

U.S. Cl. 358—11 **52 Claims**



1. A method for converting an input video signal having a first scan line rate to an output video signal having a second scan line rate, said method comprising the steps of:

generating a plurality of carrier frequencies, each carrier-frequency being associated with at least one scan line segment of said input video signal;

modulating each of said carrier frequencies with video information corresponding to said least one scan line segment of said input video signal;

holding substantially constant the modulation of each said carrier frequency between successive scan lines of said input video signal;

sampling at least some of said carrier frequencies in a sequence so as to derive a video output signal modulated with a sequence of carrier frequency modulation samples, said video output signal derived for each sampling sequence representing one decoded scan line;

repeating said sampling sequence at a rate related to the desired scan line rate of the output video signal.

4,504,853

ENHANCEMENT OF QUADRATURE MODULATED CHROMA BY LUMINANCE OR CHROMA TRANSITIONS WITHOUT CHROMA DEMODULATION

Yves C. Faroudja, 26595 Anacapa Dr., Los Altos Hills, Calif. 94022

Continuation-in-part of Ser. No. 325,038, Nov. 25, 1981, abandoned. This application Feb. 16, 1982, Ser. No. 349,017

Int. Cl.³ H04N *5/21, 9/535*

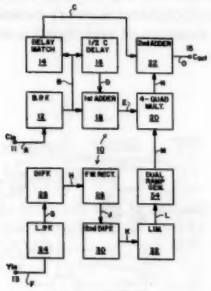
U.S. Cl. 358—37 **34 Claims**

1. An improved method of enhancing aperiodic transitions occurring in a modulated chroma component of a quadrature modulated color television signal which includes a luminance component and said modulated chroma component by reference to simultaneous aperiodic transitions occurring in said luminance component and without demodulating said modulated chroma component, said method including the steps of:

(a) deriving a chroma transition envelope signal from a transition of an unenhanced modulated chroma component;

(b) generating a uniform control signal whose occurence is timed by a transition in said luminance component which occurs substantially simultaneously with said transition of said unenhanced modulated chroma component;

(c) multiplying said chroma transition envelope signal by said control signal to provide an enhancement product; and



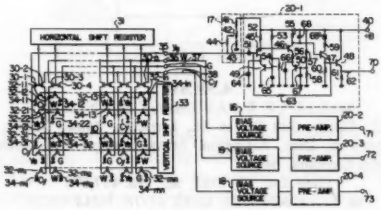
(d) combining said unenhanced modulated chroma component having said transition in phase with said enhancement product to provide an enhanced modulated chroma component with enhanced transitions characterized by shortened transition time and by alignment with simultaneously occurring transitions in said luminance component.

4,504,854

COLOR IMAGE PICKUP DEVICE

Michio Masuda, Yokohama, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 5, 1981, Ser. No. 290,109
Claims priority, application Japan, Aug. 13, 1980, 55-110223
Int. Cl.³ H04N *9/07*
U.S. Cl. 358—44 **4 Claims**



1. A color image pickup device comprising:

a plurality of photoelectric conversion cells on which light of an object is imaged,

a plurality of complementary color filters disposed in front of said photoelectric conversion cells,

means for synthesizing output signals of said photoelectric conversion cells to produce chrominance signals, and

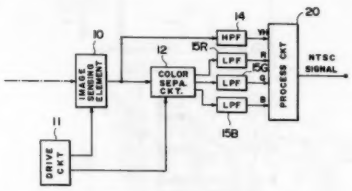
means coupled between said photoelectric conversion cells and said means for synthesizing for adjusting saturation points of a light amount for said photoelectric conversion cells to be substantially at levels equal to each other.

4,504,855

COLOR IMAGING DEVICE

Tetsuro Kuwayama, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 18, 1982, Ser. No. 390,021
Claims priority, application Japan, Sep. 17, 1981, 56-146584
Int. Cl.³ H04N *9/07*
U.S. Cl. 358—44 **36 Claims**



1. A charge-coupled imager comprising:

(A) a two-dimensional image sensing array having a plurality of columns and a plurality of rows, said sensing array generating electrical charges;

(B) anti-blooming portions having therebetween three of said columns of said sensing array, each of said anti-blooming portions having a predetermined width;

wherein the width of one second column at the center of said three columns between two adjacent anti-blooming portions is greater than those of the other, first and third columns;

a first barrier disposed between said first column and said second column; and

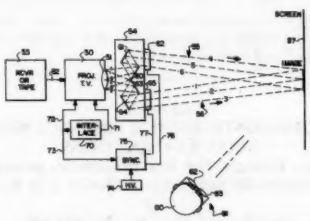
a second barrier disposed between said second column and said third column.

4,504,856

STEREO TELEVISION SYSTEM

Earle G. Jackman, Sherburn County, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Sep. 29, 1982, Ser. No. 426,503
Int. Cl.³ H04N *9/54*
U.S. Cl. 358—92 **5 Claims**



1. Stereo television apparatus comprising, in combination: means for presenting to a single television camera, light, from a subject, reaching first and second mutually spaced sites, means for alternately interrupting the light from said sites in a continuous succession at a predetermined frequency, to produce a video signal comprising trains of video frames in stereo relationship;

a television receiver projecting light toward a screen to produce thereon images determined by said video frames;

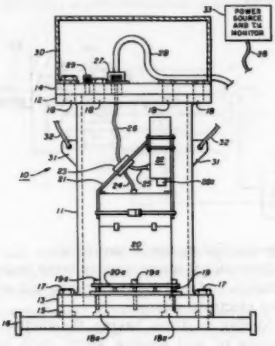
and means including a beam splitter between the receiver and the screen for alternately and oppositely rotating the planes of polarization of the projected light at said predetermined frequency,

so that when said screen is observed binocularly through eyepieces of oppositely rotated polarization, a stereo image is perceived by the observer.

4,504,857
GYRO-COMPASS POSITIONING APPARATUS

Clyde Miller; Joe Hunt, and Mark Wagner, all of Houston, Tex., assignors to Martech International, Houston, Tex.

Filed Sep. 7, 1982, Ser. No. 415,176
Int. Cl.³ H04N *7/18*
U.S. Cl. 358—99 **16 Claims**



1. In combination with an underwater pipeline junction manifold, a gyro compass positioning apparatus for lowering and accurately orienting an underwater pipeline junction manifold to the ocean floor, comprising:

a pressure housing having an upper flange on one end and a lower flange on its other end;

a pressure housing top securely attached to the upper flange forming a water tight seal;

a mounting bracket securely attached to the lower flange and forming a water tight seal;

means attaching said underwater pipeline junction manifold to said mounting bracket in fixed and known angular relation thereto;

means for determining the degree of orientation of said apparatus from true north;

means for observing said determining means from a remote location above the sea surface so that the angular disposition of said underwater pipeline junction manifold on the sea floor may be viewed and accurately arranged;

means for lowering said apparatus to the ocean floor to thus place and orient said pipeline junction manifold in a predetermined and desired position.

4,504,858
X-RAY DIAGNOSTIC SYSTEM FOR ANGIOGRAPHIC X-RAY EXAMINATIONS

Kurt Franke, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Sep. 27, 1982, Ser. No. 424,458
Claims priority, application Fed. Rep. of Germany, Dec. 8, 1981, 3148507
Int. Cl.³ H04N *5/32*
U.S. Cl. 358—111 **3 Claims**

1. An X-ray diagnostic system for angiographic X-ray examinations comprising:

an X-ray source means;

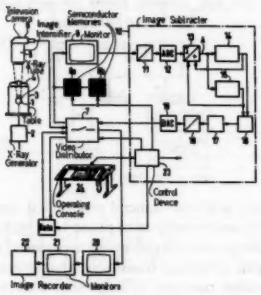
an image intensifier television chain having an output for supplying a succession of output image data representing successive images;

a patient support means disposed between said X-ray source means and said image intensifier television chain;

digital semiconductor memory means for storing said output image data from said image intensifier television chain beginning at a first memory location;

image subtraction device means having at least one image memory for storing image data which is to be subtracted from image data taken at times other than the times of the image data stored by said one image memory, said one memory storing a complete image so as to produce subtraction images which are the result of a subtraction between image data in said one image memory and the image data taken at other times;

control device means operatively associated with said digital semiconductor means for controlling the storage of said output image data representing successive images in said digital semiconductor memory means such that when the memory locations of said digital semiconductor memory



means are filled with image data, the stored image data is successively overwritten commencing at the first memory location; and

display means connected with said image subtraction device means for displaying said subtraction images;

said digital semiconductor memory means being coupled with said image intensifier television chain in advance of said one image memory of said image substraction device means such that image data stored by said digital semiconductor memory means can be selectively supplied to said one image memory of said image subtraction device means.

4,504,859
MULTIPLE X-RAY IMAGE SCANNERS

John K. Grady, 300 Foster St., Littleton, Mass. 01460, and Richard E. Rice, Arlington, Mass., assignors to John K. Grady, Littleton, Mass.

Filed Jan. 13, 1983, Ser. No. 457,678
Int. Cl.³ H04N *7/18*; G03B *41/16*; H01J *40/14*
U.S. Cl. 358—111 **18 Claims**

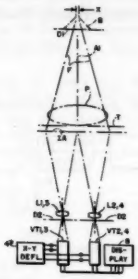
1. For converting to electrical signals an image area having a range of light intensity values at the area, apparatus comprising:

an X-ray source;

a scintillation screen having an image area responsive to X-rays from the source to produce a secondary, light image at the area;

two or more electro-optical means viewing the image area and including optical means distributing light from the image area including optical means simultaneously separating the secoadary image into at least two images with different intensity patterns and directing the different

images simultaneously on separate paths, and at least two photoelectrically responsive means, one in each path, and



each generating electrical area signals respectively corresponding to light intensities from the area viewed.

4,504,860

METHOD AND PROCESS FOR TRANSMITTING AN IMAGE

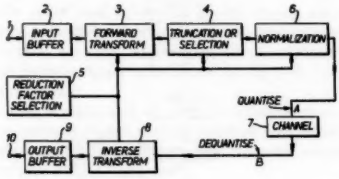
Richard C. Nicol, Ipswich; Brian A. Fenn, Woodbridge; Roger J. Clarke, Burton on the Wold, all of England, and King N. Ngan, Singapore, Singapore, assignors to British Telecommunications, London, England

Filed Jul. 15, 1982, Ser. No. 398,608

Claims priority, application United Kingdom, Jul. 22, 1981, 8122640

Int. Cl.³ H04N 7/12

U.S. Cl. 358—133 **23 Claims**



1. A method of transmitting an image, comprising: producing an array of samples representing picture elements of an original image; subjecting the samples to at least the lower sequency part of a two-dimensional unitary transformation matched to the size of the sample array, the higher sequency coefficients of the transformed sample array being omitted or not calculated so that an array of selected transform coefficients is produced, the array of selected transform coefficient being smaller than the original sample array; transmitting the selected transform coefficients; subjecting the transmitted coefficients upon reception, to a second, inverse, transformation to produce a second array of samples, and regenerating an image from the second array of samples, characterised in that the inverse transformation is matched to the size of the array of selected transform coefficients, whereby the second array of samples is smaller than the first array and the regenerated image has fewer picture elements than the original image.

4,504,861

PORTABLE TV TRANSMITTER

Joseph P. Dougherty, White Haven, Pa., assignor to EMCEE A Division of Electronics, Missiles & Communications, Inc., White Haven, Pa.

Filed Feb. 18, 1982, Ser. No. 349,961

Int. Cl.³ H04N 7/04, 5/40

U.S. Cl. 358—143 **21 Claims**

1. A portable TV transmitter comprising:
means for receiving video signals from a first video signal generator;
a video signal oscillator which produces video oscillator signals at a select frequency;
means for modulating the video oscillator signal by the video signals to produce processed video signals;
means for receiving audio signals from an audio signal generator;
an audio signal oscillator which produces an audio oscillator signal;
means for modulating the audio oscillator signal by the received audio signals to produce modulated audio signals;
means for mixing the video oscillator signals with the modulated audio signals to produce processed audio signals;
means for combining the processed audio signals and the processed video signals to produce composite television signals;
means for emitting the composite television signals; and
means of providing power for the transmitter.

4,504,862

DIGITAL CIRCUIT FOR GENERATING A BINARY SIGNAL ON THE OCCURRENCE OF A GIVEN FREQUENCY RATIO OF TWO SIGNALS

Gerhard Achtstaetter, Gundelfingen, Fed. Rep. of Germany, assignor to ITT Industries, Inc., New York, N.Y.

Filed Nov. 3, 1982, Ser. No. 439,011

Claims priority, application European Pat. Off., Nov. 19, 1981, 81109759.1

Int. Cl.³ H04N 9/44

U.S. Cl. 358—158 **4 Claims**

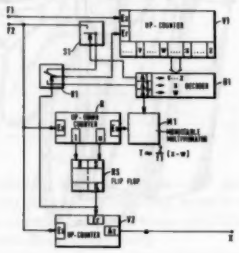
1. A digital circuit for generating a binary signal on the occurrence of a given frequency ratio of a high frequency first and a second signals, comprising:
a first up-counter having a count input to which the higher-frequency first signal is applied and whose maximum count is greater than the frequency ratio;
an up-down counter having a count input to which is applied the second signal;

a first decoder connected to outputs of the first up-counter for monitoring the attainment of a count of the first up-counter in an upper range of successive counts which includes the frequency-ratio count and the maximum count and having a first output for all range counts, a second output for a count lying a few counts before the frequency-ratio count, and a third output for the frequency-ratio count;

a first electronic make contact switch having a control input connected to the first output of the first decoder, a signal input being fed with the second signal, and an output;

a first monostable multivibrator having a trigger input and an output, the trigger input connected to the second output of the first decoder;

a first electronic switch having a control input, first and second signal inputs and an output connected to a reset



input of the first up-counter, the third output of the first decoder being coupled to the first signal input and the second signal input connected to the output of the first electronic make contact switch;

the up-down counter having a control input connected to the output of the first monostable multivibrator and at least one lower count output and at least one upper count output;

an RS flip-flop having an R input connected to the lower count output, an S input connected to the upper count output and a Q output coupled to the control input of the first electronic switch; and

a second up-counter whose maximum count is locked, having a count input receiving the second signal, and a start-reset input connected to the Q output of the RS flip-flop and a maximum-count output providing the binary signal.

4,504,863

DEVICE FOR CORRECTING A VIDEOFREQUENCY TELEVISION SIGNAL BY DYNAMIC ATTENUATION OF THE NOISE LEVEL

Jean P. Lacoste, Paris, France, assignor to Thomson-CSF, Paris, France

Filed May 25, 1982, Ser. No. 381,883

Claims priority, application France, May 27, 1981, 81 10562

Int. Cl.³ H04N *5/21*

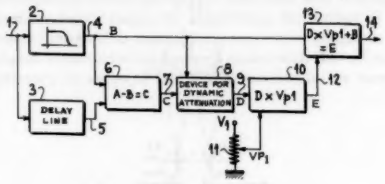
U.S. Cl. 358—167 **4 Claims**

1. A device for correcting a video-frequency television signal by dynamic attenuation of the noise level, comprising:

a filter for eliminating the high-frequency components and noise components of the video frequency signal, having an input for receiving the video frequency signal and an output for generating a filtered signal,

a difference circuit having a first input connected at the output of the filter and a second input receiving the video frequency signal for producing a contour signal by subtracting the filtered signal from the video frequency signal,

a dynamic noise attenuation device having an output for delivering a noise processed signal and having a first input connected to the output of the difference circuit and a second input connected to the output of the filter for controlling the attenuation level of the dynamic noise attenuation device with the level of the filtered signal supplied by the filter between a maximum attenuation with respect to a predetermined level of the video fre-



quency signal at which the noise can be suppressed and a minimum attenuation, and

a circuit coupled to the output of the filter and to the output of the dynamic noise attenuation device for adding the filtered signal to the noise processed signal to form the corrected video frequency television signal.

4,504,864

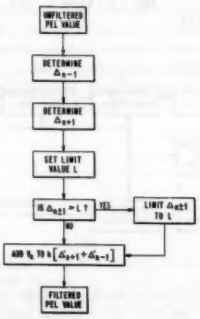
NONLINEAR FILTERING OF GRAY SCALE IMAGES

Dimitris Anastassiou, Long Island City, and William B. Pennebaker, Carmel, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 30, 1982, Ser. No. 454,783

Int. Cl.³ H04N *5/21*

U.S. Cl. 358—167 **9 Claims**



1. A method of nonlinear filtering of video images having a plurality of pels, wherein each said pel is represented by a gray scale signal having one or more bits, comprising the steps of:

determining first difference values between intensity values of a current pel and one or more preceding pels;

determining second difference values between intensity values of said current pel and one or more succeeding pels;

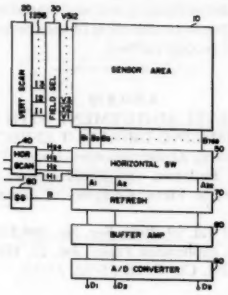
limiting said first and second difference values so that they do not exceed a predetermined limit value;

generating a filtered value for said current pel by adding said intensity value of said current pel to a sum of said limited difference values each multiplied by a predetermined constant.

4,504,865
IMAGE SIGNAL READOUT METHD FOR SOLID-STATE IMAGE SENSOR

Jun-ichi Nishizawa; Tadahiro Ohmi, both of Sendai; Makoto Murakoshi, Tokyo, and Koji Shimanuki, Minami-ashigara, all of Japan, assignors to Semiconductor Research Foundation, Sendai and Fuji Photo Film Co., Ltd., Minami-ashigara, both of, Japan

Filed Sep. 16, 1982, Ser. No. 418,677
Claims priority, application Japan, Sep. 18, 1981, 56-147576
Int. Cl.³ H01L *27/14*
U.S. Cl. 358—213 **8 Claims**



1. An image signal readout method for a solid-state image sensor which is provided with a plurality of solid-state picture element cells having a non-destructive readout characteristic and arranged two-dimensionally, a plurality of vertical scanning signal lines each having connected thereto a respective horizontal group of the picture elements cells aligned in a horizontal direction, and a plurality of a picture element signal output lines each having connected in common thereto a respective vertical group of the picture elements cells aligned in a vertical direction, comprising

providing picture element signals from the respective solid-state picture elements cells of a selected one of said horizontal groups to the respective vertical scanning signal line, for all of said horizontal groups during respective selection periods by applying vertical scanning signals to the vertical scanning signal lines, to the corresponding picture element signal output lines during each respective selection period,

reading out in each said respective selection period said picture element signals of the respective horizontal group of solid-state picture elements cells from the picture element signal output lines, and

providing a blanking period between successive ones of said selection periods, wherein, in each said blanking period, all of said picture element signal output lines are cleared by providing them with a reference potential.

4,504,866
IMAGE SENSING APPARA"US

Syuichiro Saito, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 19, 1983, Ser. No. 562,701
Claims priority, application Japan, Dec. 22, 1982, 57-225627
Int. Cl.³ H04N *5/30*
U.S. Cl. 358—213 **15 Claims**

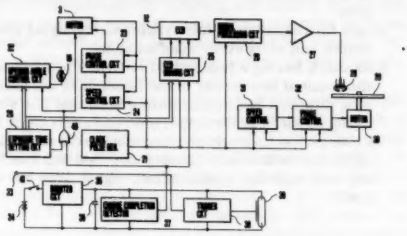
1. An image sensing apparatus comprising:

(a) image sensing means for converting an optical image into an electrical signal;

(b) storage time control means for variably controlling a storage time allowed for storing an electrical image signal at said image sensing means;

(c) shutter means for limiting an incident time of said optical image on said image sensing means; and

(d) setting means for controlling the quantity of the image signal to be stored at said image sensing means, said setting

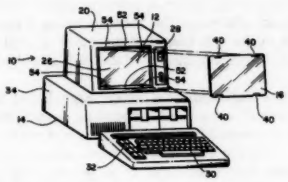


means having the storage time control by said storage time control means and the incident time control by said shutter means accomplished in predetermined combination with each other.

4,504,867
RADIATION CONTAINMENT APPARATUS AND METHOD

John D. Keller, 7324 Southwest Fwy., Ste. 800, Houston, Tex. 77074

Filed Dec. 13, 1982, Ser. No. 449,488
Int. Cl.³ H04N *5/65, 5/72*
U.S. Cl. 358—247 **15 Claims**



1. A method of reducing radiation emission from a cathode ray tube comprising:

positioning a sheet of a transparent polyvinyl chloride material in proximity to and in correspondence with the screen of said cathode ray tube; and

affixing said sheet in position exterior of said screen.

4,504,868
CONTROL SYSTEM FOR A LINE SCANNING TYPE OUTPUT UNIT

Kazuo Hasuike, Tokyo; Kazunori Konishi, Kawasaki, and Akira Kurematsu, Yokohama, all of Japan, assignors to Kokusai Denshindenwa Co., Ltd., Tokyo, Japan

Filed Feb. 4, 1982, Ser. No. 345,634
Claims priority, application Japan, Feb. 5, 1981, 56-14995
Int. Cl.³ H04N *1/40*
U.S. Cl. 358—280 **7 Claims**

1. A control system for a line scanning type output unit, with a main scanning direction and a sub scanning direction, said control unit enabling the output unit to do facsimile printing with a required line density and text printing at a required pitch comprising:

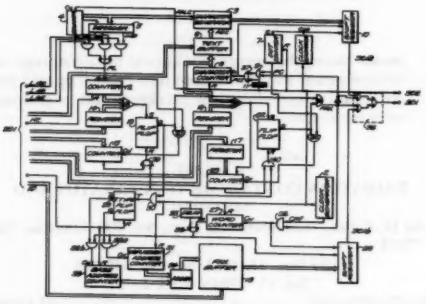
means for setting resolution in the main scanning direction of said output unit so as to correspond to the sampling frequency of an input image signal to said output unit while line density in the sub direction of said output unit is constant;

means for pre-setting said constant line density of said output

unit at a value such that said value divided by a first integer falls within an error range of ±0.3% of the required line density of the facsimile, and said value divided by a second integer falls within an error range of ±0.3% of the required pitch of the text in the sub scanning direction;

means for outputting a line synchronizing signal from said output unit at its every main scanning;

a fax clock having a time period reversely proportionate to the required line density of the facsimile in the main scanning direction and synchronizing with said line synchronizing signal from the output unit; and a text clock having a time period reversely proportionate to the required pitch of the text in the main scanning direction and synchronizing with said line synchronizing signal from the output unit;



means for selecting facsimile printing instead of text printing at both an address in the main scanning direction and an address in the sub scanning direction of said output unit respectively determined by data from a central processing unit;

means for composing said image signal and transmitting same to said output unit, depending on whether information to be printed is a facsimile or a text when said output unit is to be controlled in the main scanning direction, so that when the facsimile is to be printed said fax clock is effective while said text clock is effective when the text is to be printed; and

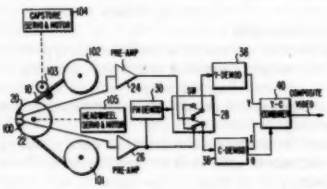
means for allotting scanning lines in a number corresponding to said first integer for the lines of the facsimile and for allotting scanning lines in a number corresponding to said second integer for the lines of the text when said output unit is to be controlled in its sub scanning direction.

4,504,869

COLOR MOVIOLA FOR TWO-TRACK VTR

Henry R. Warren, Belle Mead, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Sep. 20, 1982, Ser. No. 420,497
Int. Cl.³ H04N *9/491*
U.S. Cl. 358—312 **8 Claims**



1. A method for reproducing signals from a multitrack tape having recorded thereon at a selected linear tape speed modulated luminance-representative signals on a first track and first and second chrominance representative signals modulated at first and second carrier frequencies, repectively, on a second track, said method comprising:

scanning a pair of transducers across said tape using a linear tape speed different from said selected linear tape speed, whereby each of said transducers scans across a plurality of said tracks and alternately transduces said modulated signals;

coupling the input ports of a pair of demodulators to said pair of transducers and coupling the output ports of said pair of demodulators to utilization means; and

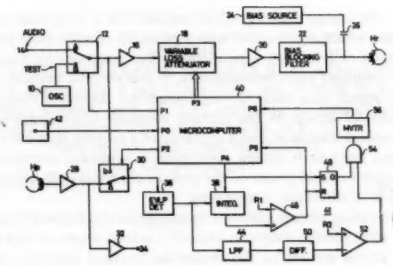
switching one of said input ports and said output ports of said pair of demodulators and said transducers cross said tracks in response to detection of the frequency of one of said first and second carriers.

4,504,870

AUTOMATIC LEVEL ADJUSTMENT WITH MEANS FOR MINIMIZING DROP-OUT EFFECTS

Masatsugu Kitamura, Atsugi; Mamoru Inami, Yokohama; Yoshiaki Tanaka, Fujisawa, and Zenju Otsuki, Tokyo, all of Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan

Filed Jul. 19, 1982, Ser. No. 399,571
Claims priority, application Japan, Jul. 23, 1981, 56-115515
Int. Cl.³ G11B *15/02, 27/36*
U.S. Cl. 360—25 **9 Claims**



1. A method for automatically setting the level of a signal to be recorded on a magnetic tape according to the magnetic properties thereof, comprising the steps of:

(a) recording a test signal on said tape;

(b) reproducing the recorded test signal;

(c) integrating the reproduced test signal to generate a ramp voltage and detecting a drop-out in said reproduced signal and repeating steps (a) and (b);

(d) if said drop-out is not detected, detecting a time period within which said ramp voltage varies from zero voltage level to a predetermined voltage level;

(e) detecting a difference between said detected time period and a reference value; and

(f) setting said signal level according to said difference.

4,504,871

MAGNETIC MEDIA TEST FIXTURE APPARATUS

James D. Berwick, Sunnyvale, and Kyle T. Lam, Fremont, both of Calif., assignors to Verbatim Corporation, Sunnyvale, Calif.

Continuation of Ser. No. 110,539, Jan. 8, 1980, abandoned. This application Jan. 25, 1982, Ser. No. 342,124
Int. Cl.³ G11B *27/36;* **G01R** *33/12*
U.S. Cl. 360—31 **7 Claims**

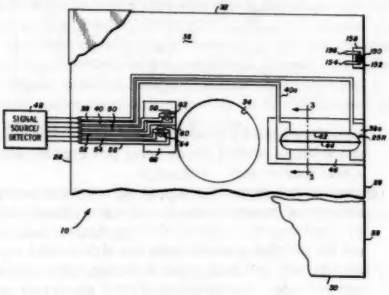
1. A test apparatus for testing a plurality of functions of a read/write head of a flexible disk drive of a disk magnetic storage system, the apparatus comprising:

a housing means fabricated of a rigid material and having

dimensions congruent to an outer jacket of a flexible disk assembly, the housing means including a central aperture for a spindle of a disk drive, and further including an oblong read aperture radially arrayed about a first edge of the housing and a circular index sensing aperture positioned near to said oblong read/write aperture;

an electrical conductor affixed to the housing means and centrally arrayed about a long axis of said oblong read aperture, the conductor being positioned to be in close proximity to a read/write head within the disk drive when the housing means is inserted within the disk drive;

signal generating means positioned remotely to the housing means and electrically connected by a conductive cable to the conductor for supplying electrical signals within the recording frequency range of between 120 kilohertz and



250 kilohertz, whereby a plurality of electrical parameters of the read/write head may be tested when the housing means is inserted within the disk drive, the signal generating means further including means for generating strobing signals; and

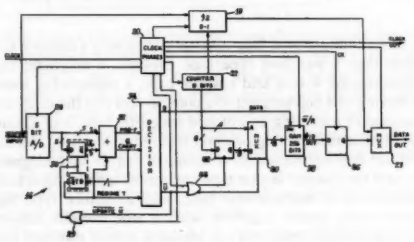
motion simulation means for actuating said read/write head whereby said read/write head will receive signals from the conductor, the motion simulation means including a first light source mounted on the housing means about said index sensing aperture and coupled to the signal generating means, said light source being strobed in accordance with said strobing signals to actuate a light receptive disk drive sensor to simulate rotation of a flexible magnetic disk inserted within said drive, whereby said disk drive is enabled.

4,504,872

DIGITAL MAXIMUM LIKELIHOOD DETECTOR FOR CLASS IV PARTIAL RESPONSE

David A. Petersen, Berkeley, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Filed Feb. 8, 1983, Ser. No. 465,042
Int. Cl.³ G11B *5/09*
U.S. Cl. 360—40 **6 Claims**



1. A digital detector with dual detecting means for Class IV partial response signalling in which precoded binary data are recorded, played back and equalized, and filtered using a Class IV partial response filter to place the data in the form of successive analog ternary values in which any transitions between ternary states in the detecting means represents a binary bit of one sense, said detector comprising,

A/D converter means for sampling said ternary values and converting said sampled values into respective multi-bit digital sample signals S_n normalized to the form (+1.0, 0.0, −1.0) with alternate digital sample signals split into respective data streams;

first and second detecting means each responsive to sample signals S_n of a respective one of said data streams, each of said first and second detecting means including signal storage means for storing one of said sample signals S_n as a respective stored sample signal S_p, state means for storing a state signal T_{IN} as an indication of the state at the time of the storing of the corresponding signal sample S_p, comparison means for comparing a current signal sample S_n with a selected predetermined linear function of the stored signal sample S_p, which function is selected according to the stored signal T_{IN}, said comparison means providing an output binary signal of said one sense when there is a change of ternary state and otherwise an output binary signal of the other sense, said comparison means further providing an update signal U and a state signal T_{out}, addressable memory means, means for addressing positions in said memory means successively and cyclically, means for reading out data bits from successively addressed positions, means for thereafter writing said output binary signals into addressed positions in said memory means, address storage means coupled to said means for addressing and operating when enabled to store the address from said means for addressing, and means responsive to said update signal U for updating the stored signal S_p by storing the current signal S_n, storing the current state signal T_{out} in the state means, and coupling said address storage means to said memory means in lieu of said means for normally addressing while said means for writing writes in a data bit, and thereafter enabling said address storage means to receive an updated address, and

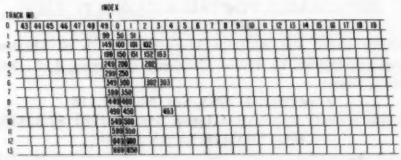
multiplexing means for interleaving the data bits read out of the respective detecting means.

4,504,873

IDENTIFICATION FIELD SCAN APPARATUS

Peter B. Bandy, Pine Island; John A. Danen; Nyles N. Heise, both of Rochester, and Donald C. Holtan, Pine Island, all of Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 4, 1983, Ser. No. 482,099
Int. Cl.³ G11B *5/012*
U.S. Cl. 360—63 **8 Claims**



1. A multiple transducer data storage device having plural media surfaces that rotate in unison and present multiple circular data tracks respectively associated with said multiple transducers to form a cylinder at a particular location of a transducer carriage access device with data stored on such data tracks in sectors comprising

formatting the data tracks within said cylinder with each sector circumferentially offset from every other sector within said cylinder;

said offset portion of each sector occurring at the leading portion of said sector and including the sector identifier (ID) field of the sector; and

circuit means for switching sequentially among said transducer heads to read each next occurring offset sector portion in sequence, whereby all of said ID fields are read during a single revolution of said media.

4,504,874

TAPE RECORDER

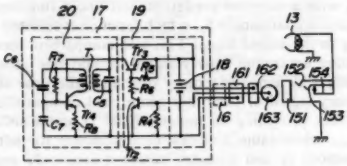
Yugo Imai, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Jul. 20, 1982, Ser. No. 400,068

Claims priority, application Japan, Jul. 23, 1981, 56-109447[U]; Jul. 23, 1981, 56-109446[U]; Jul. 23, 1981, 56-115546[U]

Int. Cl.³ G11B *5/47*

U.S. Cl. 360—66 **8 Claims**



1. A tape recorder system comprising a tape recorder housing having a signal processing circuit, a first magnetic head responsive to said signal processing circuit for recording and reproducing the sound signals onto and from a magnetic tape, a DC supply connection coupleable to a battery, a second magnetic head connected to receive DC erasing current from the DC supply connection for erasing previously recorded signals during a recording mode, and a speaker for generating the sound from signals reproduced by the first magnetic head; and an AC erasing unit capable of connecting to the housing for generating AC erasing current to be supplied to the erasing head instead of the DC supply source said erasing unit being outside of and separate from the tape recorder housing, and being mechanically and conductively coupleable to and decoupleable from said head, said tape recorder including a bias oscillator circuit connected between said recording head and the DC supply source and having an oscillator coil for generating bias current during the recording mode, said AC erasing unit including a detecting coil inductively coupled with said oscillatory coil when the erasing unit is mechanically and conductively coupled to said tape recorder for controlling the output signals of said erasing unit.

4,504,875

INFORMATION SCANNING CIRCUIT FOR USE WITH A DETACHABLE PORTABLE CASSETTE TAPE RECORDER

Kunihiko Kato, and Akihiko Murahashi, both of Maebashi, Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan

Filed Mar. 1, 1983, Ser. No. 471,216

Claims priority, application Japan, Mar. 8, 1982, 57-32338[U]

Int. Cl.³ G11B *15/02, 31/00*

U.S. Cl. 360—72.1 **10 Claims**

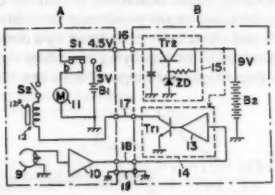
1. A circuit arrangement for use with a cassette tape recorder detachably attached to an associated powered device, for searching a piece of information from a recorded magnetic cassette tape, said cassette tape recorder having a reproduce head for deriving an output signal from a cassette tape, a motor for driving said cassette tape, and a first power source, said cassette tape recorder being capable of performing fast playback, said associated powered device having a second power source whose capacity is larger than that of said first power source, said circuit arrangement comprising:

(a) a solenoid built in said cassette tape recorder to cause the mechanism of said cassette tape recorder to terminate said fast playback when actuated in response to a change in a solenoid driving signal;

(b) a first switch for selectively supplying electrical power from said first or second power source to said motor;

(c) a second switch built in said cassette tape recorder, and responsive to the fast playback mode for connecting said solenoid to said second power source;

(d) a solenoid control circuit built in said associated powered device, and responsive to said output signal from said



reproduce head for producing said solenoid driving signal, said solenoid control circuit being powered by said second power source; and

(e) connecting means for supplying electrical power from said second power source to said solenoid and said motor, for supplying said solenoid driving signal to said solenoid, and for supplying said output signal from said reproduce head to said solenoid control circuit when said cassette tape recorder is coupled with said associated powered device.

4,504,876

MINIATURE TYPE TAPE CASSETTE

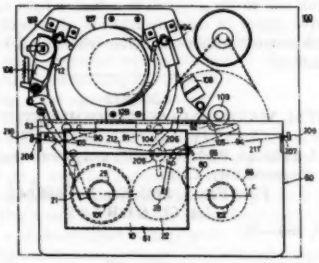
Yoshimichi Nagaoka, Yokohama, Japan, assignor to Victor Company of Japan, Ltd., Yokohama, Japan

Filed Jun. 25, 1982, Ser. No. 392,157

Claims priority, application Japan, Jun. 30, 1981, 56-97116[U]

Int. Cl.³ G11B *5/008, 15/48, 15/32;* G03B *1/04*

U.S. Cl. 360—94 **4 Claims**



1. In a miniature type tape cassette comprising a cassette case smaller than a standard type tape cassette, a magnetic tape accommodated within said cassette case, a transparent leader tape having one end secured to a take-up reel and the other end connected to a starting end of said magnetic tape, and a transparent trailer tape having one end secured to a supply reel and the other end connected to a terminal end of said magnetic tape, said transparent leader tape and trailer tape being accommodated within said cassette case, said miniature type tape cassette being loaded together with a tape cassette adapter having an external form and size identical to said standard type tape cassette with respect to a standard type recording and/or reproducing apparatus for performing recording and/or reproduction when loaded with said standard type tape cassette in a state accommodated within said type cassette adapter and

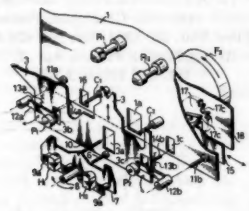
forming a predetermined tape path with said tape drawn out from said cassette case, said standard type recording and/or reproducing apparatus comprising optical tape end detection means for detecting the transparent tape, said miniature type tape cassette being loaded independently with respect to a compact type recording and/or reproducing apparatus of a type different from said standard type recording and/or reproducing apparatus, wherein: said optical tape end detection means detects the tape ends at two detecting positions, a first tape length between the supply reel and one detecting position being different from a second tape length between the take-up reel and the other detecting position, and said transparent leader tape and said transparent trailer tape have mutually different lengths respectively longer than said first and second tape lengths so that said optical tape end detection means can perform the detection, in a state where said miniature type tape cassette is accommodated within said tape cassette adapter and loaded into said standard type recording and reproducing apparatus together with said tape cassette adapter, the difference in lengths between said transparent leader tape and said transparent trailer tape corresponding to the difference between said first and second tape lengths.

4,504,877

AUTO-REVERSE TYPE CASSETTE TAPE PLAYER

Tatsuhiko Tsuchiya, Kakuda, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan

Filed Feb. 18, 1982, Ser. No. 349,752
Claims priority, application Japan, Feb. 18, 1981, 56-21843[U]
Int. Cl.³ G11B *5/008*
U.S. Cl. 360—96.2 **12 Claims**



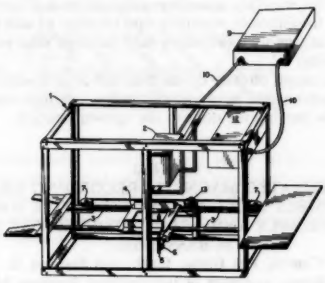
1. An auto-reverse type cassette tape player including:
a bed carrying a pair of reel shafts and a pair of capstan shafts rotatable in opposite directions;
a head base mounted on the front side of said bed by a support shaft in such a manner so as to be rockable around said support shaft;
means for moving said head base into and out of a position along the path of movement of a tape;
two magnetic heads carried by said head base at respective sides of said support shaft;
a limiting projection mounted on said head base;
slide means mounted on said bed and slidable in the direction generally parallel to the path of movement of a tape brought past either of said magnetic heads, the sliding direction of said slide means being switchable in accordance with a change in the tape feed direction;
a driving member provided on said slide means and adapted to engage with said limiting projection to cause a rocking of said head base;
said slide means having engaging slopes formed on respective sides of said support shaft;
two pinch rollers carried on respective brackets rockably carried by said bed; and
means carried by said brackets for engaging said slopes to bring said pinch rollers into selective engagement with a tape moving past respective magnetic heads.

4,504,878

SYSTEM FOR STORING AND AUTOMATICALLY RETRIEVING RECORDING DISCS

John W. Gutmann, 4581 Lucern Valley Rd., Lilburn, Ga. 30247

Filed Sep. 8, 1982, Ser. No. 416,030
Int. Cl.³ G11B *5/012*
U.S. Cl. 360—98 **4 Claims**



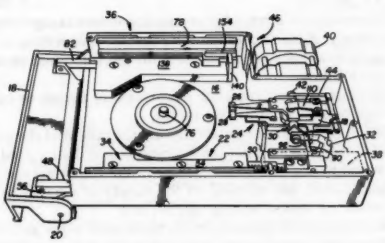
1. A device for the storage and retrieval of recording discs comprising:
(a) a cartridge means having an open top and opposing, vertical slots on opposite inside walls to accommodate a plurality of said recording discs;
(b) a horizontally movable carriage to hold said cartridge and position it under means for receiving and recording or playing back information from each of said plurality of discs;
(c) horizontal track means for positioning said carriage under said means for receiving and recording or playing back information;
(d) means for causing said carriage to move on said track means;
(e) means positioned under said track means for displacing one of said plurality of discs from said cartridge vertically upward toward said recording/playback means disposed above the carriage;
(f) means positioned between said carriage and said receiving and recording or playing back means for passing said one disc, when received from said cartridge, into the receiving and recording or playing back means and guiding its return downward to the cartridge.

4,504,879

DISC DRIVE ARRANGEMENT

George Toldi, Santa Clara; Anil Nigam, Cupertino, and Ronald A. Crain, San Jose, all of Calif., assignors to SyQuest Technology, Fremont, Calif.

Filed Jun. 4, 1982, Ser. No. 385,104
Int. Cl.³ G11B *5/54, 17/02*
U.S. Cl. 360—105 **24 Claims**



1. A disc drive arrangement for accessing information from

and recording information onto a disc retained in a cartridge comprising:

a housing;

a door;

means for mounting the door to the housing so that said door can be moved between an opened and a closed position;

at least one head;

a carriage means for mounting and transporting said head;

means for movably mounting said head to said carriage;

means for movably mounting said carriage to said housing;

motor means for positioning said carriage relative to said housing;

linkage means directly connecting said door to said carriage for urging said head away from the cartridge responsive to the moving the door to the opened position.

4,504,880

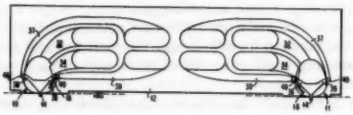
INTEGRATED MAGNETIC RECORDING HEAD ASSEMBLY INCLUDING AN INDUCTIVE WRITE SUBASSEMBLY AND A MAGNETORESISTIVE READ SUBASSEMBLY

Mark A. Church, Los Gatos, Calif., and Stephen K. Decker, Edina, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 9, 1982, Ser. No. 407,007

Int. Cl.³ G11B *5/12, 5/30*

U.S. Cl. 360—113 **8 Claims**



1. An integrated magnetic head assembly comprising:

an inductive write head subassembly comprising first and second magnetic thin film pole pieces, said pole pieces defining a nonmagnetic transducing gap therebetween, said first pole piece being planar and extended;

a read subassembly having a planar magnetoresistive element disposed in said gap, said element being electrically conductive; and

planar conductive elements in electrical contact with said planar magnetoresistive element, said magnetoresistive element and said conductive elements having a planar area circumscribed by the periphery of said extended first pole piece.

4,504,881

PROTECTIVE CIRCUIT FOR AN ELECTRIC MOTOR

Kinzo Wada, Yokohama, and Ken Enami, Kawasaki, both of Japan, assignors to Victor Company of Japan, Ltd., Japan

Filed Dec. 10, 1982, Ser. No. 448,775

Claims priority, application Japan, Dec. 21, 1981, 56-206592

Int. Cl.³ H02H *7/093*

U.S. Cl. 361—23 **7 Claims**

1. A protective circuit for an electric motor comprising:

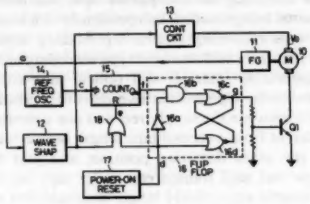
frequency signal generating means for generating a frequency signal in accordance with the rotational speed of the motor;

a switching circuit switched over to either permit or cut off supply of current to said motor;

a detecting circuit for detecting that the period of the generated frequency signal has become larger than a predetermined period due to a decrease in the rotational speed of said motor, and cutting off the supply of current to said motor by said switching circuit; and

a rotational speed control circuit responsive to the generated frequency signal from said frequency signal generating means, for controlling the rotational speed of the motor;

said detecting circuit comprising an oscillator for producing a reference frequency signal, and a frequency counter reset by the frequency signal from said frequency signal



generating means, for counting the output reference frequency signal of said oscillator.

4,504,882

REGULATED-CURRENT SOURCE AND CONTROLLED-VOLTAGE GENERATOR

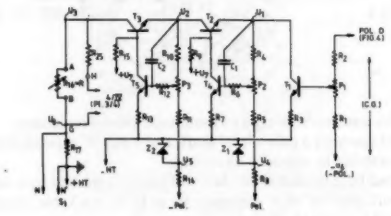
Jacques Breton, 9, avenue de Gradignan, Pessac, France

Filed Mar. 30, 1983, Ser. No. 480,449

Claims priority, application France, Apr. 7, 1982, 82 06310

Int. Cl.³ H02H *3/08*

U.S. Cl. 361—93 **9 Claims**



1. A regulated-current, controlled-voltage generator comprising

(a) a d.c. voltage source for applying a voltage across a load to cause a current to flow in the load;

(b) a control circuit for determining the value and form of the current flowing in the load according to predetermined criteria;

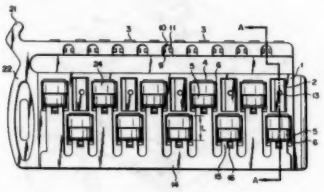
(c) a current regulating circuit in series with the voltage source and the load for regulating the current flowing in the load, the current regulating circuit including a four-pole injector for regulating the value and form of the current flowing in the load in response to the control circuit, and a first voltage regulating loop for generating a fixed voltage which forms the input to the injector; and

(d) a voltage control circuit in series with the load, the current regulating circuit and the voltage source for supplying a constant voltage to the current regulating circuit independent of the load and the current flowing in the load.

4,504,883
ARRESTER HOLDER APPARATUS FOR DISTRIBUTOR OF COMMUNICATION APPARATUS

Susumu Uchida, and Kazushige Tadokoro, both of Sagamihara, Japan, assignors to Kabushiki Kaisha Sankosha, Tokyo, Japan

Filed Mar. 21, 1983, Ser. No. 477,382
Claims priority, application Japan, May 20, 1982, 57-72736[U]
Int. Cl.³ H02H 1/04
U.S. Cl. 361—119 8 Claims



1. An apparatus for holding a plurality of arresters, comprising:

a cassette type insulating support comprising a plate and a plurality of openings formed in said plate, said openings being staggered along a longitudinal axis of said plate;

a plurality of contact members, each of which is partially molded in said cassette type insulating support and each having a first contact portion, a second contact portion, and a leg, said first contact portion being connected to a corresponding terminal of a distributor when said cassette type insulating support is mounted in said distributor, and said second contact portion extending into each of said plurality of openings from one side thereof, a difference between lengths of legs of any two adjacent ones of said plurality of contact members being greater than a length along an axial direction of each of said plurality of arresters;

a ground member having a plurality of contact portions and a common contact portion, each of said plurality of contact portions having a leg and a contact piece inserted at the other side of each of said plurality of openings, and said common contact portion being mounted on said cassette type insulating support so as to be grounded, a difference between the lengths of the legs of any two adjacent ones of said plurality of contact pieces being greater than the length along the axial direction of each of said plurality of arresters; and

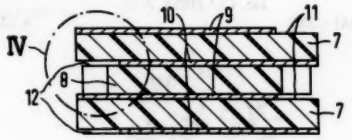
a plurality of arresters, each comprising a pair of electrodes which are detachably inserted between said second contact portion of each of said contact members exposed inside said one side of each of said plurality of openings, and each of said contact pieces of said ground member inserted in said other side of each of said plurality of openings.

4,504,884
ELECTRIC ROLL-TYPE CAPACITOR WITH CONTACTS AT THE END FACE THEREOF AND METHOD FOR MANUFACTURING THE SAME

Harald Vetter, Regensburg, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jun. 28, 1983, Ser. No. 508,587
Claims priority, application Fed. Rep. of Germany, Jun. 29, 1982, 3224194
Int. Cl.³ H01G 4/08, 1/14, 4/06
U.S. Cl. 361—323 12 Claims

1. Electric roll-type capacitor with contacts at the ends thereof, comprising a dielectric formed of plastic foils with upper surfaces wound together with a mutual offset, and an electrode wound with said foils in the form of regenerable thin metal layers disposed on part of at least one of said plastic foils defining an edge of said at least one plastic foil free of said metal layers, said metal free edge of said at least one plastic foil having a step-shaped cut formed therein defining a first step

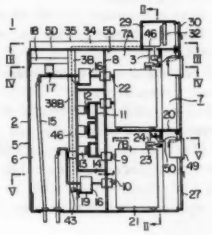


surface substantially parallel to said upper surfaces of said plastic foils and a second step surface substantially perpendicular to said upper surfaces of said plastic foils extended from said first step surface to said upper surfaces of said plastic foils, and said offset being at most 0.2 mm wide.

4,504,885
SWITCH BOARD

Isao Yoshikawa; Tooru Tanimizu, and Sinzi Sugitani, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 20, 1983, Ser. No. 486,831
Claims priority, application Japan, Apr. 23, 1982, 57-67379
Int. Cl.³ H02B 1/04
U.S. Cl. 361—342 17 Claims



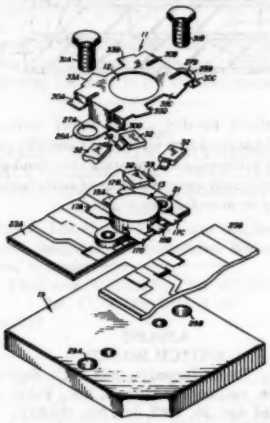
1. A switch board comprising a switch box with a casing thereof mounted on vertical supports erected on right and left sides, a conduction chamber and at least a pair of upper and lower electricity chambers with a partition wall having primary circuit breaker sections, said partition wall being located between said electricity chambers and said conduction chamber in said switch box, drawer-type electric devices thrown into and out of said electricity chamber, secondary control stationary plugs within said switch box adapted to connect and disconnect with a secondary movable plug each of said drawer-type electric devices, control lines connecting said secondary control stationary plug and control terminals mounted on said switch box, and wiring ducts containing said control lines; wherein said wiring ducts include control ducts having a control terminal arranged adjacent to the upper electricity chamber, an opening communicating with said vertical supports, vertical ducts communicating with said opening and located in said vertical supports, horizontal ducts connecting an end of said vertical ducts to said secondary control stationary plug of said lower electricity chamber and the other end of said vertical ducts to said secondary stationary plug of said lower electricity chamber.

4,504,886

GROUNDING AND POSITIONING CLIP FOR A POWER TRANSISTOR

Lawrence F. Cygan, Schaumburg; Raul Olivera, Hoffman Estates, and John F. Pottle, West Chicago, all of Ill., assignors to Motorola Inc., Schaumburg, Ill.

Filed Feb. 28, 1983, Ser. No. 470,809
Int. Cl.³ H05K *7/20*
U.S. Cl. 361—386 **5 Claims**



1. A positioning/grounding assembly for providing a DC ground and a low inductance AC ground path and for positioning electronic components, said assembly comprising,

a thermal conductive medium,

a first electronic device mounted on said thermal conductive medium, said first electronic device having at least first and second leads,

first and second printed circuit boards receiving said first and second leads respectively,

a clip positioned over said first electronic device,

a second electronic device physically and electrically attached to said clip whereby positioning said clip over said first electronic device places said second electronic device in correct physical placement relative to said first electronic device and said first and second printed circuit boards.

4,504,887

LEADLESS INTEGRATED CIRCUIT PACKAGE HOUSING HAVING MEANS FOR CONTACT REPLACEMENT

Johannes C. W. Bakermans, and Iosif Korsunsky, both of Harrisburg, Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Apr. 1, 1983, Ser. No. 481,115
Int. Cl.³ H05K *1/18*
U.S. Cl. 361—399 **10 Claims**

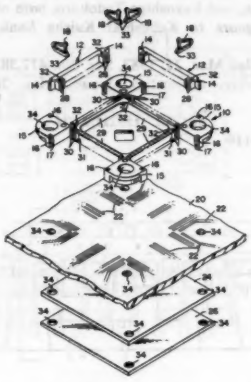
1. A chip carrier housing for connecting a leadless integrated circuit chip carrier to a circuit board, comprising:

a circuit board having conductive strips contained thereon;

chip carrier housing means disposed on said circuit board, said housing means having a continuous interior or inner wall and at least one removable exterior or outer wall, said interior and said exterior walls each having contact spacing barriers disposed perpendicular thereto, thereby defining a plurality of slots for receivably receiving electrically conductive contacts;

an electrically conductive contact disposed in each of said slots for providing electrical communication between a leadless integrated circuit chip carrier and said electrical conductors contained on said circuit board;

a leadless integrated circuit chip carrier disposed on said housing means; and



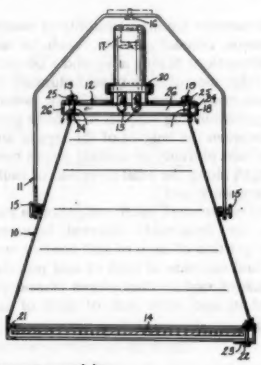
a chip carrier retaining bracket disposed on top of said housing and said leadless integrated circuit chip carrier for securing said integrated circuit chip carrier to said housing and thence said electrical contacts.

4,504,888

PHOTOGRAPHER'S DIFFUSER LIGHT

Philip R. Rosenthal, Old Saybrook, Conn., assignor to Pennywise Enterprises, Inc., Old Saybrook, Conn.

Continuation-in-part of Ser. No. 477,864, Mar. 23, 1983, abandoned. This application Jan. 25, 1984, Ser. No. 572,979
Int. Cl.³ G03B *15/02*
U.S. Cl. 362—18 **28 Claims**



1. A light fixture comprising:

a rigid hollow body having a front end and a back end, an inner surface and an outer surface;

a support means pivotally connected to the outer surface of the body for aiming the light;

means for adjusting the position of the body relative to the support means;

a transmission plate mounting means connected to the front end of the body;

a transmission plate detachably mounted to the transmission plate mounting means;

a light source mounting plate detachably mounted on the back end of the body;

a light source detachably mounted on the mounting plate; and

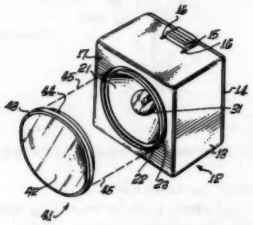
a vent between said body and said light source mounting plate for venting hot air from the interior of the hollow body.

4,504,889

COMPACT, PERSONAL-SECURITY FLASHLIGHT WITH HIGH-INTENSITY UNIFORM WIDE BEAM

Adolph E. Goldfarb, 1432 S. East Wind Cir., Westlake Village, Calif. 91361

Filed Dec. 27, 1983, Ser. No. 566,049
Int. Cl.³ F21L 7/00
U.S. Cl. 362—200 **20 Claims**



1. A compact, personal-security flashlight for use with a flashlight bulb and with a flashlight battery; said flashlight comprising:

a case;

bulb-mounting means, secured within or integral within the case, for receiving such a flashlight bulb;

battery-mounting means, secured within or integral within the case, for receiving such a battery;

electrical-connection means, secured within the case, for providing a functional interconnection whereby such a bulb when received in the bulb-mounting means receives electrical power from such battery when received in the battery-mounting means; the electrical-connection means including manually manipulable switch means for repetitively establishing, interrupting, and reestablishing such interconnection;

a reflector secured to or integral with the case and having a light-colored, unmetallized, diffuse-reflecting, generally parabolic surface juxtaposed to said bulb-mounting means for collecting light from such bulb and redirecting such light forwardly;

a beam-narrowing lens secured to the case forwardly of the reflector, for forwardly projecting light from the reflector, and light directly from such bulb, in a beam that is substantially uniform.

4,504,890

TORCHES

Johnny C. Chan, Hong Kong, Hong Kong, assignor to Lighting Concept Products Limited, Tuen Mun, Hong Kong

Filed Apr. 17, 1984, Ser. No. 601,386
Claims priority, application United Kingdom, Apr. 28, 1983, 8311601
Int. Cl.³ F21L 7/00
U.S. Cl. 362—203 **7 Claims**

1. A torch having a retracted non-working position and a projecting position where the bulb of the torch is energised by a battery, said torch comprising:

a base,

a sleeve rotatably supported by said base and capable of being twisted relative said base to move said torch between said retracted position and said projecting position,

a battery holder,

a battery in said holder,

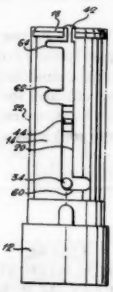
pins projecting from said holder,

a spiral groove on said sleeve into which said pins project to guide said holder in axial movement relative the axis of rotation of said sleeve,

a bulb holder resiliently urged away from said battery holder,

a bulb in said bulb holder,

an axial guide on said base through which said pins on the battery holder project to constrain said holder to axial movement,



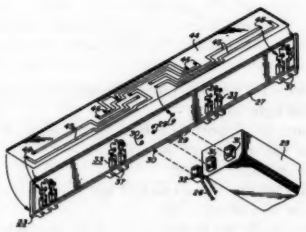
guide pins projecting from said bulb holder which also project into said axial guide to constrain said bulb holder to axial movement corresponding to that of said battery holder, a stop position for said axial guide where further axial movement of said bulb holder is prevented as it approaches said projecting position but further movement of the battery holder causes contact between said lamp carried by the lamp holder and said battery carried by the battery holder to energise said lamp.

4,504,891

FLUORESCENT LAMP SYSTEM

Bernard Mazis, Philadelphia, Pa., assignor to Keystone Lighting Corporation, Bristol, Pa.

Filed Jan. 16, 1984, Ser. No. 570,954
Int. Cl.³ F21S 3/00
U.S. Cl. 362—219 **21 Claims**



1. A pair of first and second lamp socket bars for a fluorescent lamp system, each said bar comprising in combination,

(a) an elongated plate of insulating material carrying a plurality of contact receiving cavities for holding in operative position electrical contacts suitable for energizing a plurality of fluorescent lamps,

(b) an electrical contact operatively disposed in each of said plurality of contact receiving cavities,

(c) a second elongated plate of insulating material secured against one face of said elongated plate of insulating material and mechanically pressing against some part of each of said electrical contacts,

(d) an arrangement of electrical conductors fixed upon that

surface of at least one of said elongated plate and second elongated plate of insulating material which faces the other, particular points of said arrangement of electrical conductors being positioned to make contact with said electrical contacts disposed in said plurality of contact receiving cavities, the said arrangement of electrical conductors in said first and second lamp socket bars including all of the circuit wiring for a complete fluorescent lamp system except for the wiring to any necessary ballast transformers, and

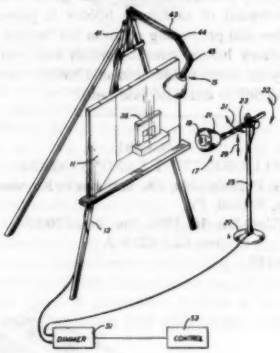
(e) connector means carried by one of said elongated plate and second elongated plate of insulating material, said connector means being connected to said arrangement of electrical conductors effective for connecting the latter to any necessary ballast transformers external to said pair of first and second lamp socket bars.

4,504,892

ART LIGHTING SYSTEM WITH STEPWISE CREATION AND DISPLAY OF WORKPIECE

Farida Y. Zulfilar, Villa La Cretaz, Chernex 1822 (Vaud), Switzerland

Filed Jan. 21, 1983, Ser. No. 460,024
Int. Cl.³ F21V *33/00*
U.S. Cl. 362—234 **16 Claims**



1. A system for creating and displaying art work comprising:

(a) a first light source;

(b) means to support said first light source at a position above and in front of the art work;

(c) a second light source;

(d) means to support said second light source to the side and in front of said art work;

(e) means to fix the intensity of said second light source;

(f) means to stepwise vary the intensity of said first light source while creating the art work, in said stepwise manner, furthermore means to display said art work with said displaying means comprising:

(g) means to adjust the intensity of one of said light sources;

(h) means to set a maximum intensity for said other light source and to automatically vary said other light source between said maximum and a minimum, which at least approaches zero intensity, at a predetermined rate; and wherein:

(i) said art work is responsive to adjustments in the intensity of said light sources such that varying the level of light incident of said art work give the appearance of a changing scene.

4,504,893

LAMP BANK

David B. Bostick, Sr., P.O. Box 331, Hopkinsville, Ky. 42240

Filed Feb. 8, 1982, Ser. No. 346,728
Int. Cl.³ F21V *33/00*
U.S. Cl. 362—253 **9 Claims**

1. A lamp bank for receiving and conceiling money comprising:

a base for supporting the lamp bank;

a lamp socket to hold a light bulb for providing illumination;

a lamp pedestal extending from said base and for supporting said lamp socket;

said lamp pedestal having a chamber formed therein for containing money and concealing money for safekeeping;

an access port concealed and formed in said lamp pedestal for selectively accessing said chamber for removing money therefrom;

input means formed in said pedestal adjacent the top of said chamber of said pedestal for receiving and inputting money into said chamber; and

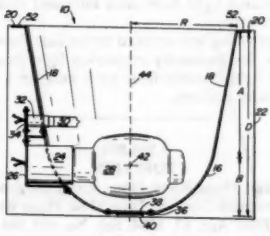
means for concealing said input means in said pedestal.

4,504,894

LIGHTING UNIT FOR PROVIDING INDIRECT LIGHT

Robert L. Reibling, Fort Thomas, Ky., assignor to Whiteway Manufacturing Co., Cincinnati, Ohio

Filed Nov. 13, 1980, Ser. No. 206,417
Int. Cl.³ F21V *7/09, 7/00*
U.S. Cl. 362—296 **4 Claims**



1. A lighting unit adapted to be mounted below eye level for indirect illumination of a work surface comprising a generally elongated bowl-shaped symmetrical reflector having a lower arcuate portion with a sharp radial sweep and a substantially frustoconical upper portion, said reflector having a reflective surface contoured to direct generally upward, in a predetermined pattern, light rays emanating from a light source within said reflector, said light source being centrally disposed with respect to the vertical axis and below the midpoint of said lighting unit, said reflective surface being the circumferential internal wall of said reflector whereby said reflective surface generally directs reflected light rays away from said vertical axis at predetermined angles for reflection by a ceiling surface

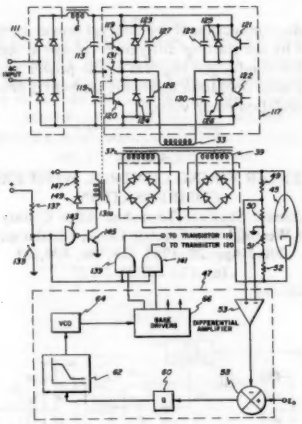
spaced above said lighting unit to provide for illumination of said work surface and whereby, beyond a maximum predetermined angle, substantially no light rays are reflected from said reflective surface toward said ceiling surface, so that glare interference in the illuminated area is reduced.

4,504,895

REGULATED DC-DC CONVERTER USING A RESONATING TRANSFORMER

Robert L. Steigerwald, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Nov. 3, 1982, Ser. No. 438,828
Int. Cl.³ H02P *13/22*
U.S. Cl. 363—17 **6 Claims**



1. A dc-dc step-up converter for supplying two ranges of high voltage dc to a load comprising:

a full bridge voltage inverter having a first and second leg, each leg having two series-connected controllable switch means with reverse current carrying ability; said inverter adapted to be coupled to external dc source;

two series-connected capacitors connected in parallel with said first leg;

circuit means for connecting the junction of said two capacitors to the junction of the two switch means in said first leg and bypassing said switch means in said first leg to obtain a first range of output voltage and disconnecting the junctions and allowing operation of said switch means to obtain the second range of output voltage;

a step-up transformer receiving ac power from said voltage inverter said transformer coupled to the output of said inverter;

rectifying means connected to the output of said transformer for rectifying the output voltage of said transformer and supplying stepped up dc voltage to the load; and

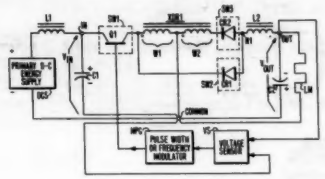
control means coupled to said rectifying means and each of said switch means, and responsive to said load voltage and to a voltage magnitude command for providing a frequency command to said inverter to adjust the input frequency to said transformer and thereby vary the output voltage, the frequencies provided to the transformer being selected to cause the transformer shunt capacitance and leakage reactance to act as a series resonant circuit and resonate at or above the damped resonant frequency of the series resonant circuit to achieve voltage step up due to the resonant rise of voltage across the shunt capacitance of the resonant circuit as well as the transformer turns ratio.

4,504,896

SWITCHING DC-TO-DC CONVERTERS

Finis C. Easter, Indianapolis, Ind., and Ramon H. Aires, Granada Hills, Calif., assignors to RCA Corporation, New York, N.Y.

Continuation of Ser. No. 245,104, Mar. 18, 1981, abandoned. This application Dec. 20, 1982, Ser. No. 451,430
Int. Cl.³ H02P *13/22*
U.S. Cl. 363—21 **12 Claims**



1. A switching dc-to-dc converter for supplying a substantially continuous flow of output current, comprising:

first and second terminals for receiving therebetween the primary dc energy to be converted;

flyback transformer having a first winding and a second winding to which said first winding is continuously transformer coupled and providing the energy storage inductance needed for sustaining said substantially continuous flow of output current, said first and second windings having respective first and second ends with currents of opposite polarities tending to flow from their first ends responsive to waxing or waning of the strength of the electromagnetic field surrounding them, the first ends of said first and second windings being connected to said first terminal, said first winding having between its first end and a point along said first winding not necessarily its second end the same number of turns as said second winding has between its first and second ends;

first switch means, which connects during each time interval in a first series of time intervals, the second end of said first winding to said second terminal, for completing a path for input current flow through said winding to cause the waxing of the strength of an electromagnetic field for storing energy to be released by the waning of the strength of said electromagnetic field during a second series of time intervals interleaved with said first series of time intervals, during which second series of time intervals said path is not completed by said first switch means;

means for recovering flyback current flow during said second series of time intervals from said point along the first winding of said flyback transformer means;

means for providing, as said substantially continuous flow of output current during both said first and second series of time intervals, a combination of currents essentially consisting of the transformed input current flow induced in said second winding during said first series of time intervals and flyback current flow during said second series of time intervals;

a third terminal for passing said output current;

a capacitor connecting between said first and third terminals; and within said means for providing a combination of currents,

a dc-conductive impedance element having a first end connected to said third terminal and having a second end,

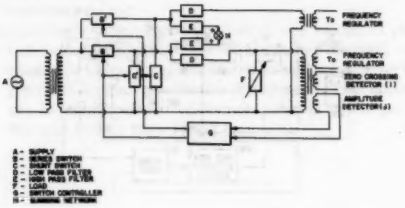
second switch means selectively connecting during each of the time intervals in said second series the second end of said d-c conductive impedance element and said point along said first winding, and

third switch means selectively connecting during each of the time intervals in said first series the second ends of said dc-conductive element and said second winding.

4,504,897
HARMONIC NOISE CONTROL IN CHOPPER TYPE VOLTAGE REGULATORS

Carl I. R. Blackwood, Falls Church, Va., assignor to White Scientific Consultants Inc., Arlington, Va.

Filed Nov. 15, 1983, Ser. No. 551,968
Int. Cl.³ H02J 1/02
U.S. Cl. 363—39 **9 Claims**



1. The method of obtaining harmonic free alternating current voltage regulation in a regulator of the waveform chopping type and reliable operation in the presence of supply frequency variations, comprising the steps of:

chopping the alternating current waveform to be regulated at a frequency producing a plurality of chops within each cycle of the alternating current waveform,

deriving from the chopped waveform two complementary wave trains with respective alternate amplitude samples and voids so phased that the voids in one of the complementary wave trains coincide with the amplitude samples in the other, and thereby having the characteristics that each wave train has equal amplitude and inverse harmonics of the noise components introduced by the chopping,

processing the two complementary wave trains in two separate channels,

passing the fundamental frequency in each channel through a separate low-pass filter,

passing the harmonic frequencies in each channel through a separate high-pass filter and summing the two results to thereby cancel the equal amplitude and inverse harmonics,

operating a load with the fundamental from one said channel, and

amplitude regulating the voltage delivered to the load by feedback controlled amplitude regulation means.

4,504,898
START-UP TRANSIENT CONTROL FOR A DC-TO-DC CONVERTER POWERED BY A CURRENT-LIMITED SOURCE

Raymond W. Pilukaitis, Byram Township, Sussex County, and Thomas G. Wilson, Jr., Morristown, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jun. 6, 1983, Ser. No. 501,298
Int. Cl.³ H02M 3/335
U.S. Cl. 363—49 **17 Claims**

1. A power converter comprising:

input means for accepting a voltage source,

output means for accepting a load,

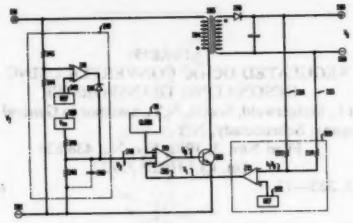
a power switch for coupling energy from the input means to the output means,

first means for generating a start-up difference voltage by comparing a voltage at the input means with a reference voltage,

second means for generating a regulation error voltage by comparing a voltage at the output means with a reference voltage,

drive means for controlling a periodic conduction interval of the power switch and operative in response to a greater magnitude of values of the start-up difference voltage and the regulation error voltage,

whereby respective amplitudes of the start-up difference voltage and the regulation error voltage are such that a

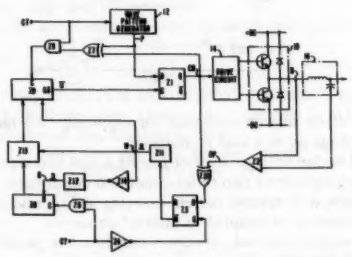


periodic conduction of the interval power switch is determined by the start-up difference voltage at start-up and a periodic conduction interval of the power switch during steady state operation following start-up is determined by the regulation error voltage.

4,504,899
INVERTER FIRING CONTROL WITH ERROR COMPENSATION

Ralph D. Jessee, Shawnee Township, Allen County, Ohio, assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 29, 1983, Ser. No. 490,261
Int. Cl.³ H02H 7/122
U.S. Cl. 363—56 **8 Claims**



1. A pole switch firing control circuit for controlling a pulse width modulated inverter in accordance with a reference pulse signal, said control circuit comprising:

means for receiving a clock signal containing voltage pulses;

means for generating a control signal having transition points for initiating a pole switch switching sequence in the inverter;

a first counter for counting the number of said clock voltage pulses which occur between a selected transition point in said control signal and the switching of an associated pole switch;

memory means for storing the number of clock voltage pulses counted by said first counter during each pole switch switching sequence; and

a second counter being presettable to start counting at a number equal to the number of clock voltage pulses previously counted by said first counter during the preceeding switching sequence of said associated pole switch, and connected to count said voltage pulses which occur after a preselected transition point of said reference signal until a preselected count has been reached, whereupon said second counter produces a carry output signal pulse which causes said means for producing a control signal to create a second transition point in said control signal.

8. A method of controlling the switching of a power pole switch in a pulse width modulated inverter in accordance with a reference pulse signal, said method comprising:

counting a series of clock pulses, which occur between a preselected transition point in a control signal and the switching point of a power pole switch in response to said transition point, with a first counter;

presetting a second counter at a count equal to the number of clock pulses counted by said first counter during a preceding switching cycle of said power pole switch;

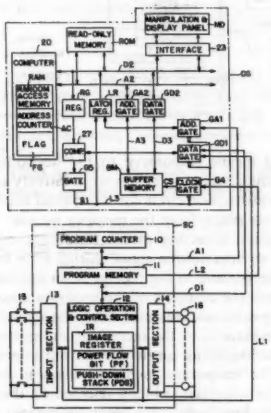
operating said second counter to count clock pulses, beginning at the preset count, when a preselected transition point occurs in a reference signal; and

causing a second transition point in said control signal to occur when said second counter reaches a predetermined count, thereby initiating a second switching cycle of said power pole switch.

4,504,900
SEQUENCE INSTRUCTION DISPLAY SYSTEM

Toshihiko Yomogida, Kariya; Itaru Sakurai, Nagoya; Tsuyoshi Yokota, Okazaki, and Sadamu Kato, Takahama, all of Japan, assignors to Toyoda Machine Works, Ltd., Kariya, Japan

Filed Feb. 5, 1982, Ser. No. 346,248
Claims priority, application Japan, Feb. 10, 1981, 56-18685
Int. Cl.³ G06F *9/06, 15/46*
U.S. Cl. 364—140 **10 Claims**



1. A sequence instruction display system for use with a sequence controller having a program memory for storing a plurality of sequence program blocks each of which includes at least one output instruction and at least one input instruction, said sequence instruction display system comprising:

memory means for storing input and output instructions included in each of said sequence program blocks and the corresponding on-off states;

data transfer means connected to said memory means for transferring the input and output instructions and the corresponding on-off states sequentially from said sequence controller to said memory means synchronously with a scan of said program memory which said sequence controller executes for successively reading out said input and output instructions from said program memory;

designating means connected to said data transfer means for designating an output instruction included in one of said sequence program blocks to be displayed;

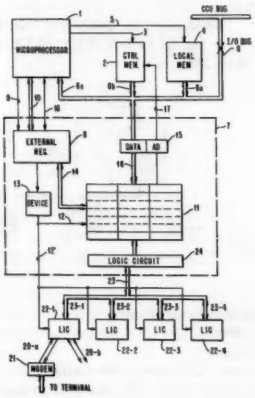
storing control means connected to said data transfer means for detecting that said one of sequence program blocks including said output instruction designated by said designating means has been stored in said memory means, so as to prevent said data transfer means from further transferring the input and output instructions and the corresponding on-off states to said memory means; and

display means connected to said memory means for displaying the input and output instructions and the corresponding on-off states based upon the same being stored in said memory means.

4,504,901
COMMUNICATION LINE ADAPTER FOR USE WITH A COMMUNICATIONS CONTROLLER

Jean L. Calvignac, La Gaude, and Rene R. Castel, Vence, both of France, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 10, 1981, Ser. No. 300,846
Claims priority, application European Pat. Off., Sep. 26, 1980, 80430018.4
Int. Cl.³ G06F *3/04*
U.S. Cl. 364—200 **10 Claims**



1. For use in a communications controller which controls the exchange of data between at least one central processing unit and terminals, a communication line adapter to which the terminals are attached through data lines, characterized in that said adapter includes:

first means comprises a microprocessor and a control memory for storing data and the control code of the microprocessor;

said means comprising an assembly of external registers, an address selection device, and a random access memory divided into zones which are addressed by means of the address selection device, each zone of said random access memory being assigned to a data line in order to store temporarily the data to be exchanged between the central processing unit and the terminals and control parameters when the zones are sequentially addressed by the address selection means, and

third interface means comprising three paths between the first and second means said paths including

a first asynchronous input/output path comprising a first bus connecting the microprocessor to the external register assembly, a second bus connecting the external register assembly and the random access memory, and an addressing line connecting the external register assembly to the address selection device, said first path being used during an initialization phase to address the random access memory zones by means of the microprocessor through the external register assembly controlling the address selection device, to assign each zone to a data line and to transfer intializing control parameters from the microprocessor

control memory into the addressed random access memory zones,

a second asynchronous path connecting the microrocessor to the random access memory through the external register assembly allowing interrupt requests to be sent to the microprocessor by the second means, and

a third synchronous path comprising a data bus and an addressing bus connecting the random access memory to the microprocessor control memory for exchanging the data between the control memory and the random access memory through cycle steal operations, under the control of the address selection device which addresses sequentially the random access memory zones without any intervention of the microprocessor microcode.

4,504,902

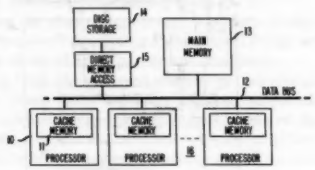
CACHE ARRANGEMENT FOR DIRECT MEMORY ACCESS BLOCK TRANSFER

Lee E. Gallaher; Wing N. Toy, and Benjamin Zee, all of Glen Ellyn, Ill., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Mar. 25, 1982, Ser. No. 361,499

Int. Cl.³ G06F *9/00, 13/00, 9/38*

U.S. Cl. 364—200 **10 Claims**



1. Apparatus comprising

main memory,

cache memory,

means coupled to said main memory for writing a block of consecutive words into said main memory by direct memory access,

means coupled to said cache memory and responsive to said means for writing a block for simultaneously invalidating all of the words of said block of consecutive words in said cache,

means coupled to said main memory for writing a word into said main memory, and

means coupled to said cache memory and responsive to said means for writing a word for invalidating only said word in said cache.

4,504,903

CENTRAL PROCESSOR WITH MEANS FOR SUSPENDING INSTRUCTION OPERATIONS

Lloyd I. Dickman, Sudbury, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

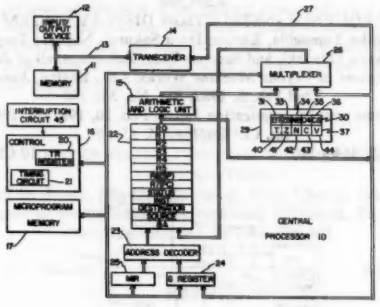
Continuation of Ser. No. 59,039, Jul. 19, 1979, abandoned, which is a continuation of Ser. No. 848,202, Nov. 3, 1977, abandoned. This application Jun. 7, 1982, Ser. No. 385,976

Int. Cl.³ G06F *9/30*

U.S. Cl. 364—200 **5 Claims**

1. A digital data processor for connection to a memory, the processor including a program counter, processing means for processing information in response to machine instructions identified in sequence by the program counter from a predetermined set of machine instructions, the processing means including a private memory means for storing information useful in processing the machine instructions, said private memory means including temporary memory means used by said processing means to store intermediate results during the processing of a machine instruction, decoding means for receiving each machine instruction and controlling the processing means in response thereto, interruption signal generating means for generating an interruption signal in response to a predetermined condition in the data processing system, interruption means responsive to the interruption signal for interrupting the sequence of machine instruction processing, interruption processing means responsive to the interruption means for processing the interruption, and special instruction processing means for enabling said processing means to respond to a special machine instruction for processing a succession of data entities in an iterative fashion during an instruction cycle comprising:

i. state storage means in said private memory means, initialized to a predetermined state at the beginning of processing of the special machine instruction, for storing information concerning the state of completion of the special machine instruction when said interruption means detects an interruption signal;



ii. retrieval means responsive to the decoding means for causing the processing means to iteratively retrieve, during each instruction cycle for the special machine instruction, a data entity from the memory means;

iii. interruption detecting means for ascertaining the existence of an interruption signal during each iteration;

iv. means responsive to the receipt of an interruption signal for altering the contents of the program counter to identify the special machine instruction being processed;

v. means responsive to the receipt of an interruption signal and to the decoding means for storing selected information in the temporary memory means in said memory means, the information being selected on the basis of the special machine instruction being processed; and

vi. restoring means for retrieving the information from said memory means and storing it in the temporary private memory means thereby to enable said processing means to resume the operation of the special machine instruction whose operation has been interrupted.

4,504,904

BINARY LOGIC STRUCTURE EMPLOYING PROGRAMMABLE LOGIC ARRAYS AND USEFUL IN MICROWORD GENERATION APPARATUS

Victor S. Moore, Pompano Beach, and Joel C. Leininger, Boca Raton, both of Fla., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 15, 1982, Ser. No. 388,556

Int. Cl.³ G06F *1/00*

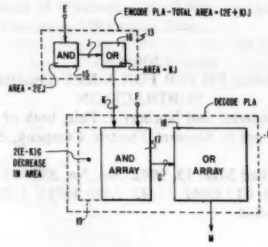
U.S. Cl. 364—200 **13 Claims**

1. Binary logic structure requiring less space on an integrated circuit chip and comprising:

an encode programmable logic array responsive to a first group of binary input signals for producing a smaller number of binary signals which are encoded to identify different binary value combinations for the first group of binary input signals;

a decode programmable logic array responsive to a second group of binary input signals and to the encoded binary signals produced by the encode programmable logic array for producing binary output signals representing logical functions of binary input signals in both the first and second groups;

the encode and decode programmable logic arrays being formed on a single integrated circuit chip;



and the chip space occupied by the encode programmable logic array being less than the additional chip space that would be required if the encode and decode programmable logic arrays were replaced by a single programmable logic array for receiving all the binary input signals in both the first and second groups.

4,504,905

DIGITAL CONTROL SYSTEM INCLUDING MEANS FOR MAINTAINING SIGNALS SUPPLIED THEREBY WITHIN LIMITING VALUES

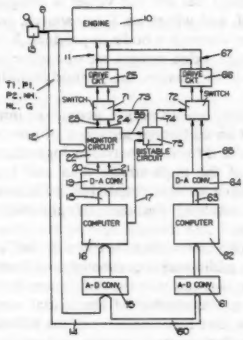
Robert G. Burrage, Solihull, England, assignor to Lucas Industries PLC, England

Filed Aug. 27, 1982, Ser. No. 412,106

Claims priority, application United Kingdom, Sep. 5, 1981, 8126926

Int. Cl.[3] **G06F** *11/20, 15/16*

U.S. Cl. 364—200 **5 Claims**



1. A full-authority digital control system comprising an apparatus responsive to electrical input signals, a first digital computer responsive to a plurality of operating conditions of said apparatus for generating first digital control signals, a second computer responsive to at least some of said operating conditons for generating second control signals, switching means for deriving said input signals either from said first or from said second control signals, and a monitoring circuit including means responsive to at least some of said operating conditions for generating limiting values of said first control signals, said monitoring circuit also including means for deriving said input signals only from those of said first control signals which are within said limiting values, said switching means being responsive to excursions for more than a predetermined time of any of said first control signals beyond a limiting value thereof, for isolating said apparatus from said first control signals and for causing said input signals to be derived from said second control signals.

4,504,906

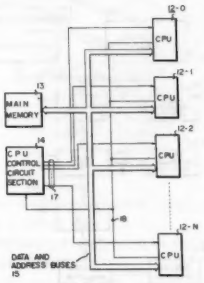
MULTIPROCESSOR SYSTEM

Hiroshi Itaya, and Kenji Nakatsugawa, both of Tokyo, Japan, assignors to Anritsu Electric Company Limited, Tokyo, Japan

Filed Nov. 30, 1982, Ser. No. 445,611

Int. Cl.[3] **G06F** *15/16*

U.S. Cl. 364—200 **3 Claims**



1. A multiprocessor system, comprising:

pulse generator means for generating a train of signal pulses;

counter circuit means coupled to count said signal pulses from said pulse generator means;

permission signal decoder means coupled to said counter circuit means and responsive to successive count values therein for generating successively varying usage permission code signals;

common bus means;

main memory means;

a plurality of central processing units which are coupled to one another and to said main memory means by said common bus means, each of said central processing units comprising at least a microprocessor, a logic circuit section, and bus drive means coupled to said common bus means, each of said central processing units being coupled to receive said usage permission code signals from said permission signal decoder means, each of said microprocessors being operable to initiate generation of a bus usage request signal when access to said common bus means is required for transfer of data between the corresponding central processing unit and another one of said central processing units, and acting to terminate said bus usage request signal when said data transfer is completed, each of said logic circuit sections being responsive to generation of said bus usage request signal by the corresponding microprocessor in conjunction with input of a corresponding one of said usage permission code signals for generating a bus available signal, said bus available signal acting on said bus drive means such as to enable data transfer into and out of the corresponding central processing unit over said common bus means;

said counter circuit means having a control terminal coupled in common to all of said central processing units and responsive to generation of said bus available signal by any of said central processing units for halting counting by said counter circuit means until termination of said bus available signal, whereby said permission signal decoder means continues to apply to a central processing unit which is generating said bus available signal the corresponding usage permission code signals, until termination of said bus available signal, whereupon counting by said

counter circuit resumes and consecutive cyclic variation of said usage permission code signals from said permission signal encoder means is resumed.

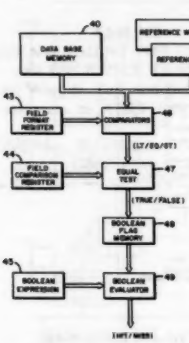
4,504,907
HIGH SPEED DATA BASE SEARCH SYSTEM

Bennett W. Manning, Eagan; Leo J. Slechta, Jr., Rosemount, both of Minn., and Kuo Y. Wen, Donners Grove, Ill., assignors to Sperry Corporation, New York, N.Y.

Continuation of Ser. No. 161,993, Jun. 23, 1980, abandoned. This application Feb. 24, 1983, Ser. No. 469,610

Int. Cl.³ G06F *7/22*

U.S. Cl. 364—200 **13 Claims**



1. In a digital computer system wherein a special purpose processor used for searching receives a plurality of records to be searched, plus receives search criteria which define both what is to be searched for and how said records are to be searched meaning how the hit or miss results of searching are to be qualified, plus receives commands to enter into a search, a said special purpose search processor responsive to said commands for searching said plurality of records in accordance with said search criteria in order to produce a hit or a miss result of said searching comprising: controller means controlled by a microprocessor comprising

first interfacing means for receiving via an interface said plurality of records plus said search criteria plus said commands from said computer system;

second interfacing means for supplying via a bus said plurality of records to comparison array means for storage therein, and for also supplying via said bus a first partial part of said search criteria, which first partial part includes the reference word to which said plurality of records are compared plus at least some, first, criteria of comparison, to said comparison array means;

sequencer means for first causing, responsively to said commands, said comparison array means to sequentially search each of said plurality of records in accordance with said first partial part of said search criteria in order to produce comparison first results of said search,

evaluation means for firstly sequentially comparing said comparison first results produced by said comparison array means in accordance with a second partial part of said search criteria, which search criteria partial part includes at least some further, second, criteria of comparison, in order to produce a final comparison result, said hit or miss result of said searching; and

a comparison array means formed as a matrix of identical comparison circuits, being of a first number of said comparison circuits in a first dimension which first number is proportional to the number of said plurality or records, and being of a second number of said comparison circuits in a second dimension which second number is proportional to the size in bits of each said plurality of records, said first number times said second number of indentical comparison circuits in a matrix forming said comparison array means comprising

memory means for storing said entirety of said plurality of records; and

sequential comparison means for secondly sequentially comparing each of said plurality of records in accordance with said first partial part of said search criteria; and

comparison results means for developing first comparison results resultantly to said secondly sequentially comparing.

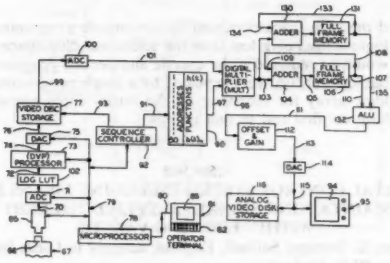
4,504,908
MATCHED FILTER FOR X-RAY TEMPORAL SUBTRACTION

Stephen J. Riederer, and Norbert J. Pelc, both of Wauwatosa, Wis., assignors to General Electric Company, Schenectady, N.Y.

Filed Mar. 15, 1982, Ser. No. 358,741

Int. Cl.³ G06F *15/42, 1/02;* H04N *5/32*

U.S. Cl. 364—414 **29 Claims**



1. A method of imaging a blood vessel in a body where the period before a bolus of X-ray contrast medium arrives in the vessel is designated the pre-contrast period, the period during which constrast medium is flowing in the vessel is designated the post-contrast period and the period following the latter when the medium has left the vessel is designated the after-contrast period, and where an X-ray source, when energized, projects a beam through a body to produce X-ray images and means including a video camera are operative to produce data representative of the images, the method including the following steps:

during said pre-contrast period, acquire an initial mask X-ray image and an additional sequence of pre-contrast images and take the difference between logarithmic data representative of the mask image data and logarithmic data representative of the respective additional images and store the resulting sequence of pre-contrast difference image data,

when the contrast medium arrives in the vessel, start to acquire an additional sequence of post-contrast and after-contrast images and take the differences between logarithmic data representative of the initial mask image and logarithmic data representative of the additional post-contrast and after-contrast images and store the resulting sequence of difference image data,

multiply the sequence of pre-contrast, post-contrast and after-contrast difference image data by respective coefficients, the coefficients by which the post-contrast difference image data are multiplied being proportional to the projected intensity, h, of the contrast medium bolus at time (t) and registered with the post-contrast difference images so that a selected one of the coefficients is applied to the corresponding post-contrast image containing maximum contrast medium, and the coefficients applied to the pre-contrast and after-contrast difference images are selected so that the summation of all coefficients equals zero or close to zero, and

sum the results of the sequence of multiplications of coefficients and difference image data to produce a set of data representative of the contrast medium in the vessel.

4,504,909

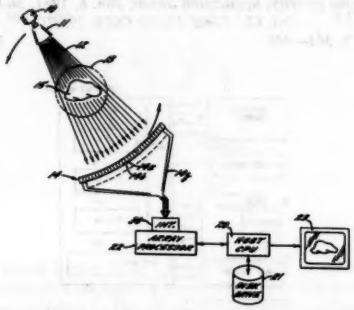
METHOD OF USING AN ARRAY PROCESSOR FOR REAL TIME PROCESSING

Kishore C. Acharya, West Allis; Thomas J. Gilbert, and Terry R. Griffie, both of Waukesha, all of Wis., assignors to General Electric Company, Milwaukee, Wis.

Filed Sep. 30, 1982, Ser. No. 428,458

Int. Cl.³ G01T *1/29*; G06F *15/52*

U.S. Cl. 364—414 **6 Claims**



1. For use with a data acquisition system having a sampling interval of predetermined duration during which is acquired a set of data having N channels, a method of processing the acquired data in an array processor in real time as it is being acquired comprising the steps of:

(a) inputting an array of p sets into the array processor memory,

(b) processing N/m channels of the p sets where m is a compression factor greater than one,

(c) stopping the processing to input the next acquired set into a new array,

(d) repeating steps (b) and (c) until all N channels of the p sets are processed,

(e) repeating steps (b), (c) and (d) on the new array until all acquired data is processed,

and coordinating p, m and N so that the step (b) processing is completed in less time than the sampling interval.

4,504,910

PRESENT POSITION DISPLAY DEVICE

Shigeru Araki, Tamayama, and Nobuhiko Suzuki, Tokyo, both of Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan

Filed Nov. 27, 1981, Ser. No. 325,303

Claims priority, application Japan, Nov. 26, 1980, 55-169331[U]

Int. Cl.³ G06F *15/50*

U.S. Cl. 364—424 **23 Claims**

1. A present position display device adapted to be mounted in a vehicle and comprising:

(a) a head member having light-emitting indication means;

(b) an elongated carriage mounting said head member;

(c) first driving means for moving said head member in an Y-axis direction coinciding with the longitudinal direction of said carriage;

(d) holding means mounting said carriage;

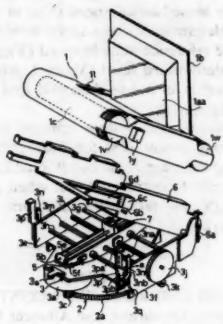
(e) second driving means for driving said carriage on said holding means in an X-axis direction perpendicular to said Y-axis direction;

(f) third means for driving said second driving means and said first driving means in a manner corresponding to the travel of said vehicle;

(g) a sheet pack disposed above and close to a plane where said head member moves;

(h) an indicating window means provided in said sheet pack for rendering said light emitting indication means visible to an operator of said vehicle;

(i) a plurality of maps in said sheet pack each consisting of a



transparent or translucent flexible member on which map information is printed;

(j) means for selectively transferring one of said maps to said indicating window means; and

(k) accommodating means within said sheet pack for winding and accommodating maps other than the map positioned in alignment with said indicatint window means.

4,504,911

VEHICLE WHEEL BRAKE ANTI-LOCK SYSTEM WITH LOW SPEED CONTROL

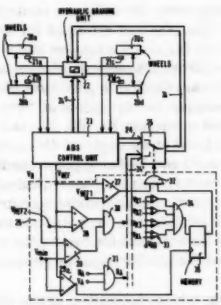
Volker Braschel, Heilbronn; Wolf-Dieter Jonner, Beilstein, and Heinz Leiber, Oberriexingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttghart, Fed. Rep. of Germany

Filed Jun. 18, 1982, Ser. No. 389,588

Claims priority, application Fed. Rep. of Germany, Jul. 15, 1981, 3127902

Int. Cl.³ B60T *8/02*

U.S. Cl. 364—426 **7 Claims**



1. Vehicle wheel anti-lock system having

a plurality of sensors (**21***a*–**21***d*) for sensing speed of the wheels (**20***a*–**20***d*) of the vehicle;

a braking effort control unit (**22**) for controlling braking pressure being applied to the vehicle wheels;

a system control unit (**23**) connected to and controlling the brake effort control unit (**22**), said brake effort control unit having applied thereto sensing signals applied from said plurality of sensors and evaluating wheel acceleration/de-

celeration, wheel speed, and generating a signal (V_{REF}) representative of a reference vehicle speed,

and comprising, in accordance with the invention,

an additional control channel (26) for providing predetermined braking functions including

means for, initially, maintaining braking effort and, subsequent thereto, lowering the braking effort if

(a) the sensed actual speed (V_R) of a wheel is less than a predetermined wheel speed level (V_{min}), and

(b) the reference vehicle speed (V_{REF}) is above a second predetermined level (V_{REF2}), which second predetermined level is less than said first predetermined level (V_{REF1});

and wherein said system control unit further includes switching means (25) for transferring command of the braking function of said additional control channel to the brake effort control unit (22) when the reference vehicle speed (V_{REF}) falls below said first predetermined level (V_{REF1}).

4,504,912

SATELLITES AND ROLL/YAW CONTROLS THEREFOR

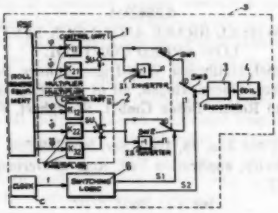
Ernst Brüderle, Ottobrunn, and Albrecht Reindler, Riemerling, both of Fed. Rep. of Germany, assignors to Messerschmitt-Bölkow-Blohm Gesellschaft mit beschränkter Haftung, Munich, Fed. Rep. of Germany

Filed Jul. 12, 1982, Ser. No. 397,066

Claims priority, application Fed. Rep. of Germany, Jul. 16, 1981, 3128054

Int. Cl.³ B64G *1/10*

U.S. Cl. 364—434 **4 Claims**



1. An arrangement for roll/yaw control of a satellite with pitch momentum bias and arranged for movement on a near polar orbit with the aid of a magnet coil entering into interaction with the earth's magnetic field, characterized in:

(a) timing means for dividing the time of the orbit of satellite and producing timing pulses at times representing four successive quadrants P1, P2, P3, and P4, the quadrants being inclined at an angle of 45° to the equator and the quadrants P2 and P4 being polar quadrants and the quadrants P1 and P3 being equator quadrants;

(b) a first control units for producing satellite control signals when the satellite is in the polar quadrants P2 and P4 and a second control unit for producing satellite control signals when the satellite is in the equator quadrants P1 and P3;

(c) inverting means responsive to the timing means for inverting the sign of the satellite control signals when the timing pulses represent quadrants P3 and P4 and for maintaining the satellite control signals when the timing pulses represent the quadrants P1 and P2;

(d) said first control unit being arranged to respond to signals representing roll angles and roll velocity for the formation of the satellite control signal;

(e) said second control unit being arranged to respond to signals representing roll angles and roll velocity and having acceleration signal means for producing roll acceleration signals for the formation of the satellite control signal;

(f) switching means for switching between the said control units; and

(g) transfer means responsive to the inverted and maintained satellite control signals for applying the signals to the coil for controlling the roll/yaw of said satellite.

4,504,913

ELECTRONIC NAVIGATOR FOR AUTOMOTIVE VEHICLES

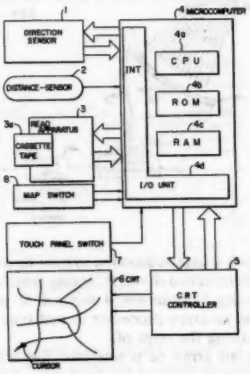
Kunio Miura, Okazaki; Koshi Hasebe, Anjo; Takashi Ono, Kariya; Kazushi Akutsu, Kariya; Shinji Ohyama, Kariya, and Kazuaki Minami, Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Jun. 7, 1982, Ser. No. 386,094

Claims priority, application Japan, Jun. 8, 1981, 56-87714

Int. Cl.³ G06F *15/50*; G09B *29/10*

U.S. Cl. 364—449 **5 Claims**



1. A navigator for automotive vehicles comprising:

distance detection means for detecting the running distance of the vehicle;

direction detection means for detecting the running direction of the vehicle;

operation means responsive to detection signals from said distance detection means and said direction detection means for calculating a present position of the vehicle;

display means for electronically displaying a road map and the present position of the vehicle on the road map;

present position display control means for providing a control signal to said display means to display the present position of the vehicle calculated by said operation means;

memory means for storing a first map data for displaying a particular road map and a first scale data indicating a scale of the particular road map, and for storing a second map data indicative of another road map having a scale different from that of the particular road map and a second scale data indicating a scale of said another road map;

alternation means for generating alternation commands to allow said display means to display said another road map instead of the particular road map displayed on said display means;

map display control means for reading the first map data from said memory means to allow said display means to display said particular road map, and responsive to the alternation commands of said alternation means for reading the second map data from said memory means to allow said display means to display said another road map of the different scale instead of the previous road map; and

present position calibration means responsive to the changing operation of the road map of said map display control means for calibrating the present position of the vehicle displayed on said display means in accordance with the

first scale data and the second scale data stored in said memory means.

4,504,914
PHOTOGRAMMETRIC DEVICE FOR AIRCRAFT AND SPACECRAFT FOR PRODUCING A DIGITAL TERRAIN REPRESENTATION

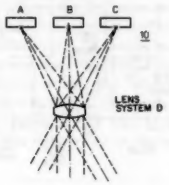
Otto Hofmann, Kirchstockach, Fed. Rep. of Germany, assignor to Messerschmitt-Bölköw-Blohm Gesellschaft mit beschrankter Haftung, Munich, Fed. Rep. of Germany

Filed Nov. 13, 1981, Ser. No. 321,207

Claims priority, application Fed. Rep. of Germany, Nov. 19, 1980, 3043577

Int. Cl.³ G01C *11/2*

U.S. Cl. 364—456 **4 Claims**



1. A sensor device to be carried on aircraft or spacecraft, which craft travel along an arbitrary flight path, for providing data corresponding to the course and orientation of the craft, and a digital display of the terrain over which the craft travels, including a group of at least first, second and third sensor lines each comprising a row of photosensitive semiconductor elements all of which are arranged transversely of the flight path in an image plane for providing terrain line images corresponding to a terrain image directed along an optical axis onto said sensor lines, the improvement comprising that at least one of said sensor lines extends in said image plane to form an oblique angle relative to other ones of said sensor lines so that the terrain line images produced by said at least one sensor line intersect the terrain line images produced by said other ones of said sensor lines.

4,504,915
METHOD AND APPARATUS FOR INDIVIDUALIZED POSTAGE VALUE COMPUTING

Edward P. Daniels, Bridgeport, and Daniel F. Dlugos, Huntington, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Jun. 30, 1982, Ser. No. 393,839

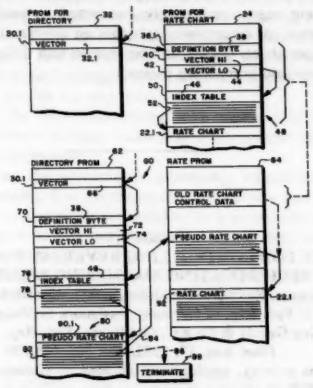
Int. Cl.³ G06F *15/40*

U.S. Cl. 364—466 **9 Claims**

5. A method of individualizing the computation of postage values to preselected mailing services with a system having a keyboard for operator controlled entries, a program controlled processor and replaceable memories in which data is stored in separate memory devices that include a rate chart memory containing rate chart data applicable to postage values and a directory memory containing vectors to direct the program to desired rate charts, wherein said rate charts include chart range data to identify the range of the rate chart and wherein the program includes a preliminary comparison test to examine from said chart range data whether postage for an article to be mailed can be obtained from the rate chart, comprising the steps of:

directing said program in response to the actuation of a keyboard entry from a vector located in the directory memory to a pseudo rate chart located in the directory memory; and

selectively and effectively directing said program from said pseudo rate chart to either a rate chart to which access is



requested by said keyboard entry or to a termination of the program.

4,504,916
ABNORMAL FLOW DETECTING CIRCUIT IN PAPER SHEET COUNTING MACHINE

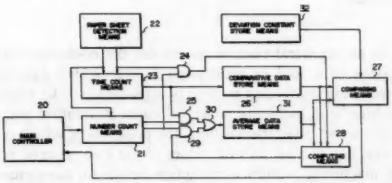
Yoshinobu Oka, Tokyo, Japan, assignor to Laurel Bank Machine Co., Ltd., Tokyo, Japan

Filed May 7, 1982, Ser. No. 376,033

Claims priority, application Japan, May 8, 1981, 56-66373[U]; May 9, 1981, 56-66825[U]

Int. Cl.³ G06F *15/46*

U.S. Cl. 364—471 **7 Claims**



1. A circuit for detecting abnormal flows in a paper sheet counting machine wherein sheets of paper which are temporarily stacked in an inlet section are drawn out through a paper sheet passage, one at a time, and are counted, which comprises;

length detecting means for detecting the length of each paper sheet when said each paper sheet passes through a predetermined position of said paper sheet passage and issuing a respective length signal for the passage of said each paper sheet;

memory means operatively connected to said length detecting means for storing length data obtained from each length signal;

computing means operatively connected to said memory means for calculating average data of lengths of paper sheets from length data stored in said memory means, said average length data being stored in said memory means;

renewal means operatively connected to said memory means and said computing means for renewing said average length data stored in said memory means by providing the newest length data from said memory means to said computing means corresponding to the passage of said each paper sheet;

comparing means operatively connected to said memory means for comparing said newest length data and said

average length data to generate a difference signal representative of the difference between said newest length data and said average length data; and

judging means operatively connected to said comparing means for determining whether an abnormal flow of the paper sheets occurs, in response to said difference signal from said comparing means.

4,504,917

DEVICE FOR CONTROLLING REVERSAL POINTS OF A RECIPROCATING MACHINING MEMBER

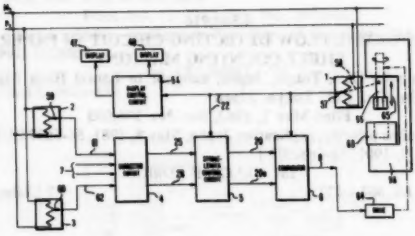
Hans Grimm, Esslingen-Berkheim, and Gunter Richter, Nabern, both of Fed. Rep. of Germany, assignors to Maschinenfabrik Gehring GmbH & Co KG, Ostfildern, Fed. Rep. of Germany

Filed Aug. 17, 1982, Ser. No. 408,738

Claims priority, application Fed. Rep. of Germany, Aug. 22, 1981, 3133246

Int. Cl.³ G06F *15/46*

U.S. Cl. 364—474 **15 Claims**



1. In an electrical control device for the contactless travel limitation of a tool or workpiece holder which executes a reciprocating machining motion of adjustable stroke length in a machine tool, including an actual value transmitter and first and second set point transmitters, the positions of which represent first and second desired values of the two reversal points of the machining motion, a correction device for compensating disturbances, and a comparator and evaluation device which, upon equality between the actual value and one of the desired values, furnishes a reversal signal controlling the machining motion, the improvement comprising the correction device for compensation disturbances being a stroke control device, including:

(a) difference forming means operatively connected to said transmitters for comparing at least one of the first and second desired values set by the first and second set point transmitters with the actual value to form therefrom a difference signal representing at least in part the magnitude of the difference between said actual value and said one of the first and second desired values;

(b) memory means operatively coupled to said difference forming means for receiving therefrom and at least temporarily storing said difference signal;

(c) setting means for setting a control input for an initial reversal point which is within the limits of said first and second desired values; and

(d) summing means operatively connected to said memory means and to said setting means for adding said difference signal and said control input to form a corrected desired value for the desired value compared in said difference forming means, defining an updated reversal point.

4,504,918

ARRANGEMENT FOR CONTROLLING THE OPERATION OF A GRABBING CRANE FOR LOADING AND UNLOADING A SHIP

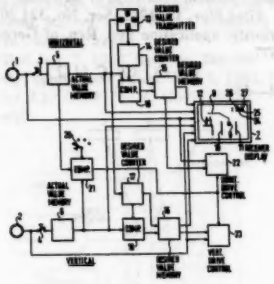
Arnold Axmann, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Mar. 10, 1982, Ser. No. 356,296

Claims priority, application Fed. Rep. of Germany, Mar. 13, 1981, 3109784

Int. Cl.³ G06F *15/20*

U.S. Cl. 364—478 **8 Claims**



1. An arrangement for controlling the operating of a bulk material grabbing crane having a grab bucket, comprising a display, an actual value memory for storing limiting values corresponding to the upper edges of an enclosure into and from which bulk material is loaded and unloaded, means coupled to the display for causing two spaced bars corresponding to the upper edges of the enclosure to be displayed on the display in accordance with the values stored in the actual value memory, means coupled to the display for causing an image of the grab bucket to be displayed on the display in accordance with the actual position of the grab bucket, a desired value memory for storing values corresponding to desired locations of the grab bucket, means for setting the desired values into the desired value memory, and means for comparing the limiting actual values stored in the actual value memory and the desired values stored in desired value memory and providing an output indicative of the comparison.

4,504,919

METHOD OF CONTROLLING TIRE ASSEMBLY LINES

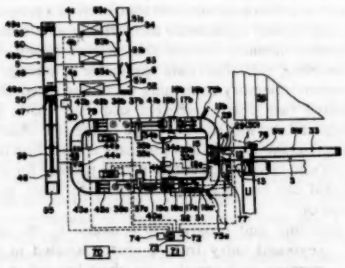
Hiroshi Fujii, Higashi Hiroshima; Akito Okamoto, Hiroshima, and Tuyoshi Watanabe, Higashi Hiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Aug. 24, 1982, Ser. No. 411,031

Claims priority, application Japan, Aug. 25, 1981, 56-133799

Int. Cl.³ G06F *15/46*

U.S. Cl. 364—478 **3 Claims**



1. A method of controlling tire assembly lines which com-

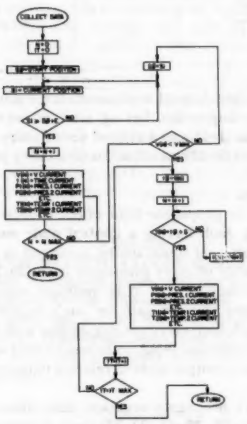
prises the steps of successively applying information of various kinds of tires and wheels for each one unit of motor vehicle, into a computer for the tire assembly lines so as to memorize the information for a plurality of units of motor vehicles in said computer, successively supplying tires and wheels pooled according to the kinds, one by one, onto supply lines for the tires and wheels for continuous transportation thereof per each one unit of motor vehicle, based on the information signal from said computer, into first assembly lines where tire mounters and inflators are sequentially disposed, assembling the tires and wheels thus fed into tire and wheel assemblies by actuating the tire mounters and inflators according to the kinds of tires based on signals from said computer, successively transporting said tire and wheel assemblies one by one, continuously for each one unit of motor vehicle, into second assembly lines provided with balancers for adjusting tires for balancing, causing said balancers to function according to the kinds of tires, based on signals from said computer for the balance adjustment, thereafter, transferring the tire and wheel assemblies thus subjected to the balance adjustment into a discharge line for transportation thereof one by one, and applying confirmation information of at least one of the tires or tire and wheel assemblies flowing through the respective assembly lines into said computer from said respective assembly lines for identification and display of flow of said at least one of the tires or tire and wheel assemblies by display means.

4,504,920

DATA ANALYSIS AND DISPLAY METHOD FOR RECIPROCATING EQUIPMENT IN INDUSTRIAL PROCESSES

John Mickowski, 129 Main St., Franklin, N.J. 07416

Filed Aug. 12, 1981, Ser. No. 292,168
Int. Cl.³ G01D *3/08*; G06F *15/46*
U.S. Cl. 364—550 **6 Claims**



1. A diagnostic method for analyzing and monitoring the process parameters of a die casting operation in which a linear reciprocating injection device is traversed over a fixed stroke length at high speed comprising the steps of:

(a) dividing said stroke length into a predetermined multiple number of incremental positions;

(b) generating analog data corresponding to at least the position of said injection device and the pressure developed by said injection device at each such incremental position;

(c) recording the time transpired in the movement of said injection device along said stroke length;

(d) calculating the velocity of said injection device at such incremental position by dividing the traversed distance between incremental positions with the transpired differential in time between said positions;

(e) graphically displaying the data corresponding to pressure and velocity on a display screen of a cathode ray tube as a function of the incremental position of said injection device along said stroke length until said velocity reaches a predetermined minimum level, with said display forming a master profile for said data;

(f) storing the data representing said master profile at a predetermined address location in a nonvolatile memory of a microcomputer;

(g) repeating the sequence of generating, calculating and storing analog data corresponding to pressure and velocity as a function of stroke position for a second die casting operating to form a current profile of such data for such second operation, and

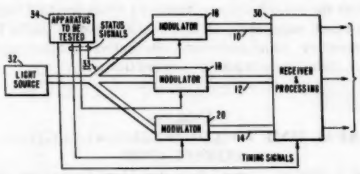
(h) displaying said current profile on said display screen along with said master profile for diagnostic comparison purposes.

4,504,921

MULTI-CHANNEL TEST SYSTEM USING OPTICAL WAVEGUIDE MODULATORS

Anthony T. Nasuta, and Robert A. Boenning, both of Timonium, Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 276,767, Jun. 24, 1981, abandoned.
This application Dec. 12, 1983, Ser. No. 560,271
Int. Cl.³ G02B *5/14*; G06F *11/22*
U.S. Cl. 364—550 **3 Claims**



1. A test system comprising:

(a) an optical beam splitting manifold comprising an input branch of optical waveguide and a plurality of output branches each joining said input branch to form an optical manifold having one input and a plurality of outputs;

(b) a plurality of optical modulators, each including at least first and second separated branches of optical waveguide being disposed in an electro-optical substrate with first ends of said first and second branches coupled to an end of one of said outputs of said optical manifold and second ends of said first and second branches joining to form an output of one of said modulators;

(c) electrically conductive electrode means disposed on the surface of said substrate such that when an electrical potential is applied to said electrically conductive electrode means, said at least first and second separated branches of optical waveguides comprising said modulator are subjected to a differential electrical field thereby changing the relative propagation velocity of optical energy through said first and second branches of optical waveguide thereby modulating the optical beam transmitted through said optical modulator via said optical manifold;

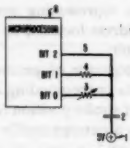
(d) a source of optical energy coupled to said one input of said optical beam splitting manifold; and

(e) optical receiving means coupled to the output of said optical modulator to determine the status of electrical signals coupled to said electrically conductive electrode means by analyzing the optical output signals of said modulator.

4,504,922
CONDITION SENSOR

Richard A. Johnson, and Hans G. Mattes, both of Indianapolis, Ind., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Oct. 28, 1982, Ser. No. 437,313
Int. Cl.³ G05D *23/24, 23/20*
U.S. Cl. 364—557 **9 Claims**

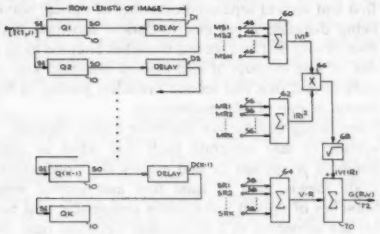


1. A condition sensor comprising:
a parallel multiport microprocessor;
a potential source;
a precision resistor having first and second ends, said first end being connected to a first port of said microprocessor;
a condition responsive transducer whose resistance bears a known relation to the magnitude of the condition being sensed having first and second ends, said first end being connected to a second port of said microprocessor; and
a capacitor having first and second ends, said first end being connected to said second ends of said resistor and of said transducer and said second end being connected to said potential source;
said microprocessor determining the value of said condition from the ratio between threshold times for said capacitor to reach equivalent charge states through paths having respective time constants alternative resistor-capacitor and transducer-capacitor connections.

4,504,923
REAL TIME TWO-DIMENSIONAL DIGITAL CORRELATOR

Richard S. Schlunt, Loma Linda, and Hans-Peter Schmid, Alta Loma, both of Calif., assignors to General Dynamics, Pomona Division, Pomona, Calif.

Filed Jul. 19, 1982, Ser. No. 399,407
Int. Cl.³ G06F *15/31*
U.S. Cl. 364—728 **19 Claims**

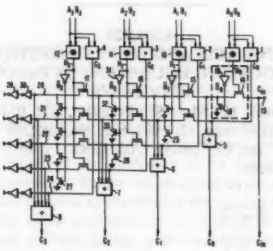


1. A two-dimensional digital correlator for comparing succeeding portions of a source vector and a reference vector in real time and providing an indication of correlation between them comprising:
means for repetitively comparing a reference vector with successive portions of a source vector, the reference vector being of a dimension less than or equal to the source vector;
means coupled to the comparing means for developing signals from said repetitive comparisons corresponding respectively to categories of magnitudes of the source vectors, magnitudes of the reference vector, and dot products of the reference and source vectors;
a plurality of summing means coupled respectively to the signal developing means for summing said signals by categories to develop summations in respective categories;
means coupled to selected summing means for multiplying together the summations of the magnitude signals and taking the square root of the resulting product; and
further summing means coupled to the square root taking means and the remaining summing means for summing said square root and the summation of the dot product signals to provide an image correlation output in real time with said comparisons.

4,504,924
CARRY LOOKAHEAD LOGICAL MECHANISM USING AFFIRMATIVELY REFERENCED TRANSFER GATES

Peter W. Cook, Mt. Kisco, N.Y.; Hung-Hui Hsieh, San Jose, and Glen S. Miranker, Sunnyvale, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 28, 1982, Ser. No. 392,828
Int. Cl.³ G06F *7/50*
U.S. Cl. 364—787 **1 Claim**



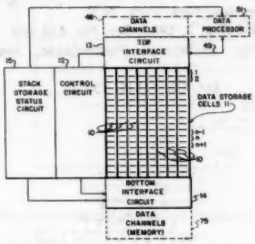
1. Carry lookahead logical mechanism for a number of bit positions of ascending order, having a set of carry generate logical mechanism (1–4) and a related set of carry propagate logical mechanisms (9–12) associated with a carry propagation triangle (13–33),
characterized by
(a) a set of carry propagate field effect transistor transfer gates (14–17), each having a control node and first and second bidirectional signal nodes, arranged in series subsets as a plurality of carry propagate lines (20–24) respectively related each to a bit order position, essentially one carry propagate transfer gate for each higher order bit position in each such carry propagate line with first signal node being designated input node and second signal node being designated output node in relation to carry propagation;
(b) a set of carry propagate negation field effect transistor transfer gates (18, 25–27, 32–33) each having a control node and first and second signal nodes, each having its first signal node connected to the output node of the respectively related carry propagate transfer gate (14–17) and to a respectively related one of said carry propagate lines (20–24), and having its second signal node connected to reference potential; and
(c) a set of carry propagate negation control lines ($\overline{H}_0$–$\overline{H}_3$) connected to the carry propagate logical mechanisms (9–12) and to the control nodes of said set of carry propagate negation transfer gates (18, 25–27, 32–33) for controlling conduction of individual ones of said carry propagate negation transfer gates complementary to conduction of related individual ones of said carry propagate transfer gates (14–17, etc.), whereby each carry propagate transfer

gate is provided affirmative conductivity or complementary affirmative back-circuit prevention by driving its output node via its respectively related carry propagate negation transfer gate to reference potential.

4,504,925
SELF-SHIFTING LIFO STACK

Klein S. Gilhousen, San Diego, Calif., assignor to M/A-Com Linkabit, Inc., San Diego, Calif.

Filed Jan. 18, 1982, Ser. No. 340,388
Int. Cl.³ G06F *13/00*
U.S. Cl. 364—900 **31 Claims**



1. A self-shifting last-in-first-out stack for a data processing system, comprising

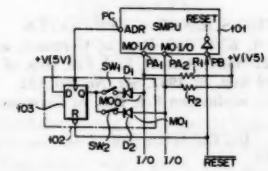
a linear array of data storage cells interconnected for enabling stored data to be shifted to or from an adjacent cell; and

a control circuit having a linear array of control cells corresponding to the linear array of data storage cells with each (n)th control cell from the top of the stack being connected to the corresponding data storage cell and its adjacent data storage cells for sensing the storage states of the corresponding data storage cell, and its adjacent data storage cell, and its adjacent data storage cells and in response to said sensed states, for causing stored data to be shifted from the (n)th cell in the array of data storage cells from the top of the stack into the (n+1)th cell whenever the (n)th cell is full, the (n+1)th cell is empty and the (n−1)th cell is full; and for causing stored data to be shifted into the (nth) cell from the (n+1)th cell whenever the (n)th cell is empty, the (n+1)th is full and the (n−1)th cell is empty, wherein n is an integer greater than one.

4,504,926
MODE SETTING CONTROL SYSTEM

Shinjiro Toyoda, Yokohama, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Apr. 6, 1982, Ser. No. 365,894
Claims priority, application Japan, Apr. 21, 1981, 56-60129
Int. Cl.³ G06F *3/00*
U.S. Cl. 364—900 **13 Claims**



1. A mode setting control system for mode data and other data, comprising:

processing means including a plurality of pins for processing data;

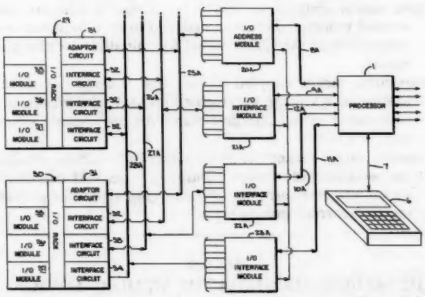
mode setting means electrically connected to at least one of said pins for writing mode data and other data into said processing means; and

control means electrically connected to at least one of said pins to which said mode setting means is not connected and to said mode setting means and said processing means, for controlling said processing means and said mode setting means to permit the pins to which said mode setting means is connected to receive data other than mode data.

4,504,927
PROGRAMMABLE CONTROLLER WITH EXPANDABLE I/O INTERFACE CIRCUITRY

John E. Callan, Milwaukee, Wis., assignor to Allen-Bradley Company, Milwaukee, Wis.

Filed Sep. 8, 1982, Ser. No. 415,915
Int. Cl.³ G06F *9/06*
U.S. Cl. 364—900 **3 Claims**



1. In a programmable controller having a processor which repeatedly executes a user control program and an I/O scan program including an I/O scan sequence, and having a fixed number of I/O buses for interfacing the processor with a corresponding number of I/O modules, the improvement therein comprising:

an I/O address module connected to one of the I/O buses for receiving data from the processor and generating a rack address on a first I/O expansion bus said I/O address module including means for signaling the processor that the I/O address module is connected to said one I/O bus;

a set of I/O interface modules connected to a set of other ones of the I/O buses and to a corresponding set of additional I/O expansion buses, each I/O interface module being operable to couple data between one of said other I/O buses and one of said additional I/O expansion buses;

an I/O rack which includes:

(a) an adaptor circuit connected to the first I/O expansion bus for receiving the rack addresses generated thereon and producing an enabling signal when its preselected rack address is received thereon; and

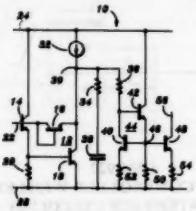
(b) a set of I/O modules each coupled to one of the additional I/O expansion buses to couple data between devices on a machine being controlled and its associated additional I/O expansion bus when the enabling signal is produced;

wherein the processor includes means responsive to the signal from the I/O address module for altering the I/O scan program such that a different I/O scan sequence is performed in the I/O scan program's next execution.

4,504,928
CURRENT RAMP GENERATOR

Robert B. Davies; Ira Miller, both of Tempe, and Robert N. Dotson, Mesa, all of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Aug. 30, 1982, Ser. No. 413,050
Int. Cl.³ G11C *19/08*; H03K *4/08*
U.S. Cl. 365—11 5 Claims



1. A current ramp generator circuit having a first voltage conductor, a second voltage conductor, an input conductor responsive to an input signal, and a current sinking conductor, for controlling the ramp of a waveform, comprising:

gate means coupled to said first voltage conductor, said second voltage conductor, and said input conductor, and responsive to said input signal for initializing a charging signal;

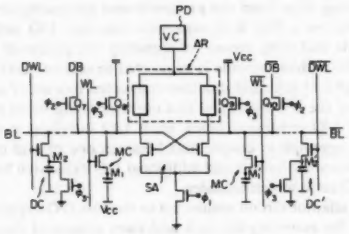
capacitive means coupled to said first voltage conductor, said second voltage conductor and said gate means, and responsive to said charging signal for providing a signal; and

current mirror means coupled to said first voltage conductor, said second voltage conductor, and said capacitive means and responsive to said charging signal for providing said current sinking signal.

4,504,929
DYNAMIC SEMICONDUCTOR MEMORY DEVICE

Yoshihiro Takemae, Tokyo; Tsuyoshi Ohira, Kawasaki, and Seiji Enomoto, Yokohama, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Nov. 24, 1982, Ser. No. 444,499
Claims priority, application Japan, Nov. 27, 1981, 56/190067
Int. Cl.³ G11C *11/40*
U.S. Cl. 365—210 4 Claims



1. A dynamic semiconductor memory device comprising:

a pair of bit lines including first and second bit lines;

a sense amplifier operatively connected to said pair of bit lines;

a real cell operatively connected to said first bit line of said pair of bit lines;

a dummy cell, operatively connected to said second bit line of said pair of bit lines, for performing a read-out operation;

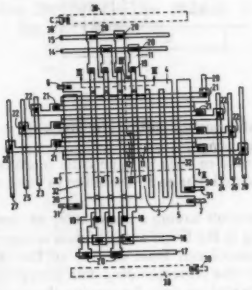
an active restore circuit, operatively connected to said pair of bit lines, for pulling up the bit line potential of the bit line on the higher potential side of said pair of bit lines, in which the potential difference is increased by the read-out operation; and

a test power source pad, operatively connected to said active restore circuit, for receiving and providing an optional and normal power source voltage to said active restore circuit.

4,504,930
CHARGE-COUPLED DEVICE

Hendrik A. Harwig; Jan W. Slotboom, and Marcellinus J. M. Pelgrom, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 2, 1982, Ser. No. 414,109
Claims priority, application Netherlands, Sep. 4, 1981, 8104102
Int. Cl.³ G11C *13/00*
U.S. Cl. 365—238 6 Claims



1. A charge-coupled device in the form of an SPS memory comprising a system of juxtaposed parallel registers which are provided at a surface of a common semiconductor body and which form a matrix of memory cells, hereinafter termed parallel section, and which at the inputs are coupled to a common series input register for inputting the information, and at the outputs are coupled to a common series output register for reading the information, characterized in that two surface regions for draining parasitic charge carriers which flows from the part of the semiconductor body surrounding the memory to the memory are defined in the semiconductor body along the edge of the memory, the said surface regions extending substantially only along the edge of the parallel section and on either side thereof, and that the said surface regions are situated at a distance from the outermost registers of the parallel section which is at most approximately of the same value as the distance between the registers of the parallel section.

4,504,931
ECHO-SOUNDING APPARATUS

Hans Drenkelfort, Kiel, Fed. Rep. of Germany, assignor to Honeywell-Elac-Nautik GmbH, Kiel, Fed. Rep. of Germany

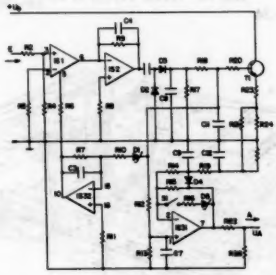
Filed Aug. 20, 1982, Ser. No. 410,122
Claims priority, application Fed. Rep. of Germany, Aug. 21, 1981, 3133080
Int. Cl.³ G01S *7/60*, *7/66*
U.S. Cl. 367—115 12 Claims

1. In echo sounding apparatus of the type having an electro-acoustic receiving transducer which supplies input signals through controllable amplifier means to a recorder for recording the echo signals on current sensitive paper, the improvement which comprises:

means for varying the gain of said controllable amplifier means as a function of the amplitude of the input signal

such that the gain is reduced according to an exponential function as the signal exceeds a limit value by an increasing amount;

first and second frequency dependent networks connected in parallel to the output of said controllable amplifier means, said networks being designed such that one network attenuates lower frequencies of the input signal more than the



other network attenuates higher frequencies of the input signal;

a differential amplifier provided in the signal having first and second inputs, and an output connected to supply signals to said recorder; and

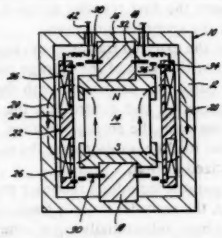
means connecting the outputs of said first and second networks to the first and second inputs respectively of said differential amplifier.

4,504,932

GEOPHONE HAVING A NON-CONDUCTIVE COILFORM

Peter C. Sandt, Houston, Tex., assignor to Metrix Instrument Co., Houston, Tex.

Filed Feb. 8, 1982, Ser. No. 346,698
Int. Cl.³ G01V *1/16*
U.S. Cl. 367—183 **4 Claims**



1. In a geophone having a case having magnetic field producing means secured to the case, a coilform connected to the case by spring means which allow axial movement of the coilform relative to the case but which restrict lateral movement of the coilform, an electric coil carried by the coilform for movement in the magnetic field, the improvement in the coilform comprising,

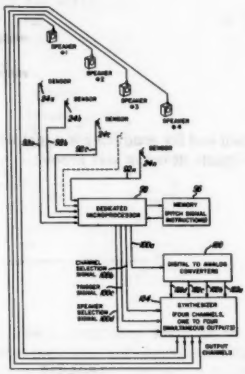
said coilform being entirely of a non-conductive molded plastic coilform having near zero open circuit dampening.

4,504,933

APPARATUS AND METHOD FOR PRODUCING SOUND IMAGES DERIVED FROM THE MOVEMENT OF PEOPLE ALONG A WALKWAY

Christopher Janney, 34 Summit Ave, Somerville, Mass. 02143

Continuation-in-part of Ser. No. 49,196, Jun. 18, 1979, abandoned. This application Sep. 14, 1982, Ser. No. 417,911
Int. Cl.³ G08B *3/00*; G01H *1/02*
U.S. Cl. 367—197 **5 Claims**



1. An apparatus for translating into esthetically programmed sound images the movements of one or more persons moving along an architecturally defined walkway comprised of a plurality of sensing means, the sensing means being mounted in spaced relationship one to another along the walkway, a plurality of sound emitting devices, the devices being mounted in spaced-array along the walkway, sound generating and amplifying means and a programmable circuit means having multiple input channels and multiple output channels, the individual sensing means being connected each respectively, to one input channel of the programmable circuit means, the sound emitting and generating means being connected, each respectively, to one output channel of the programmable circuit means, whereby the movements of one or more persons along the walkway may be detected by the sensors and through the action of the programable circuit means selectively actuating the sound generating means causing preprogrammed sound to be emitted at the sound emitting means mounted along the walkway therewith creating a preprogrammed sound image in response to each person's presence and movements along the walkway.

4,504,934

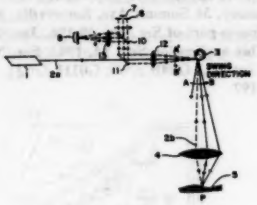
OPTICAL SIGNAL REPRODUCING APPARATUS

Shinichi Tanaka, Kyoto; Ikuo Matsuda; Namio Hirose, both of Hirakata, and Kazutsugu Kobayashi, Takatsuki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 146,117, May 2, 1980, abandoned. This application Sep. 24, 1981, Ser. No. 305,346
Int. Cl.³ G11B *11/18*
U.S. Cl. 369—18 **6 Claims**

1. An optical signal reproducing apparatus, said apparatus reproducing signals stored in a groove in which signals have been recorded, said apparatus comprising: a light source for radiating a light beam; an objective lens for converging said irradiating light beam into a small area on the surface of said groove in which signals have been recorded; an optical scanner for scanning said irradiating light beam on said objective lens at a selected frequency so as to vary the direction in which said irradiated light beam is incident toward said small area; and a photo-detector for detecting the reflected light beam from said

surface of said groove only when said reflected light beam traces back a path which is the same as that of said irradiating



light beam and for producing a signal which is a reproduction of said signals stored in said groove.

4,504,935

ELECTRODYNAMIC FOCUS AND RADIAL SLIDE DRIVE FOR AN OPTICAL DISC SYSTEM

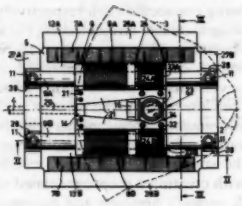
Gerardus L. M. Jansen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 11, 1983, Ser. No. 483,804

Claims priority, application Netherlands, Feb. 14, 1983, 8300540

Int. Cl.³ G11B *7/00*

U.S. Cl. 369—32 **3 Claims**



1. An apparatus for recording and/or reading information on an optically readable disc (3) which is rotatable about an axis of rotation (2), which apparatus comprises:

frame (5),

a slide (6) which is movable over the frame along a radial path (4) relative to the axis of rotation (2),

electrodynamic slide drive means (5, 7, 8, 9) for driving the slide along the radial path,

an objective (1) which is arranged on the slide and which is movable relative to the slide along a focusing axis (18) parallel to the axis of rotation (2),

electrodynamic focusing drive means (5, 7, 9, 24) for driving the objective along the focusing axis, and

an objective bearing arrangement comprising bearing means (21, 22, 31) connected to the slide (6) and bearing means connected to the objective, characterized in that there are provided radial-drive means (33) for the objective (1) for subjecting the objective (1) to directly, i.e. not via the bearing means (21, 22, 31, 32) to forces acting along the radial path (4) of the slide (6).

4,504,936

MODULAR DATA STORAGE SYSTEM

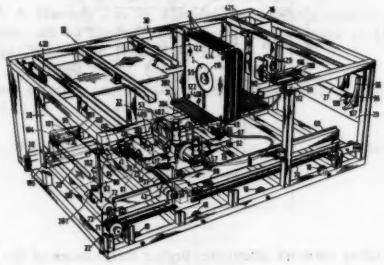
Johannes W. Faber, and Jacobus A. deVos, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 3, 1981, Ser. No. 298,843

Claims priority, application Netherlands, May 21, 1981, 8102495

Int. Cl.³ G11B *17/00, 5/48*

U.S. Cl. 369—34 **7 Claims**



1. A modular data storage system for a plurality of data carriers each having an elongate data carriable side, in which side data is recordable, and from which side data is readable, which system comprises:

a recorder apparatus including first means for supporting a data carrier in a recorder operating position, the recorder apparatus also including means for recording and/or reading data on or from a data carrier located in the recorder operating position;

a storage module for storing a plurality of data carriers in storage positions at which the data carriers are arranged adjacent one another, the storage module including a module frame and second means for supporting a plurality of data carriers in the frame, the storage module also including an internal transport device, accommodated within the storage module frame, for transporting a data carrier between the storage positon within the storage module and a first transfer position at a back of the storage module;

an external transport device, cooperatively associated with the back of the storage module, for transporting a data carrier between the first transfer position and a loading position near the recorder apparatus;

an enclosure for the external transport device, the enclosure being located at the back of the storage module, and

an electronic control unit, associated with the storage module, for coordinating and controlling the transport of a data carrier between the storage position in the storage module and the loading position near the recorder apparatus, characterized in that.

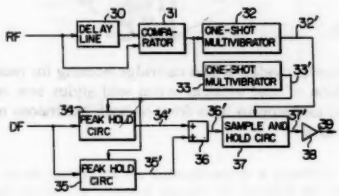
the recorder apparatus includes a recorder module having a module frame, the recorder module frame and the storage module frame have substantially equal outer dimension so that the modules are arrangeable substantially adjacent one another, the loading position of a data carrier is located at a back of the recorder module, the external transport device is cooperatively associated with the back of the recorder module, the enclosure for the external transport device is located at the back of the recorder module, and the recorder module further includes an internal transport device, disposed within the recorder module frame, for transporting a data carrier between the loading position at the back of the recorder module and the recorder operating position inside the recorder module.

4,504,937

OPTICAL INFORMATION TRACKING APPARATUS

Seiji Yonezawa, Hachioji; Tatsuo Horikoshi, Toyokawa, and Toshiaki Tsuyoshi, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 29, 1982, Ser. No. 454,489
Claims priority, application Japan, Jan. 6, 1982, 57-349
Int. Cl.[3] H04N 5/76; G11B 7/00
U.S. Cl. 369—44 7 Claims



1. In an information reproducing apparatus including a laser beam source, a rotating record medium provided with an information track in the form of a succession of alternating depressed areas and non-depressed areas along the length of said track, an optical system provided between said laser beam source and said record medium for applying a light beam of said laser beam source onto said track, and a photodetector for sensing the light beam diffracted by said track, said photodetector including four photodetector elements disposed respectively in first to fourth quadrants of a plane defined by an origin aligned with the light axis of said optical system, an axis in parallel with the direction of said track and an axis perpendicular to said track, information being reproduced from output signals of said four photodetector elements,

an optical information tracking apparatus comprising:

first means for producing a sum signal representing the sum of said output signals of said four photodetector elements;

second means for producing a difference signal representing the difference between a signal which is the sum of the output signal of the photodetector element in said first quadrant and the output signal of the photodetector element in said third quadrant and a signal which is the sum of the output signal of the photodetector element in said second quadrant and the output signal of the photodetector element in said fourth quadrant;

third means for producing two pulse signal respectively indicating a positive peak point and a negative peak point of said sum signal;

first peak hold means and second peak hold means respectively for holding a positive peak value and a negative peak value of said difference signal, one of said two pulse signals of said third means effecting control over the hold function in said first peak hold means and said second peak hold means; and

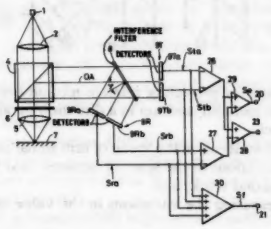
fourth means for synchronously detecting the output signal of said first peak hold means and the output signal of said second peak hold means with the other of said two pulse signals of said third means, the output signal of said fourth means being used as the signal for tracking said information.

4,504,938

DEVICE FOR FEEDBACK CONTROLLING FOCUS OF AN OPTICAL SYSTEM IN AN INFORMATION RECORDING/REPRODUCING APPARATUS

Osamu Tajima, Ayase, Japan, assignor to Victor Company of Japan, Limited, Japan

Filed Apr. 7, 1982, Ser. No. 367,035
Claims priority, application Japan, Apr. 7, 1981, 56-51956; Nov. 1, 1981, 56-174930
Int. Cl.[3] G11B 7/00
U.S. Cl. 369—45 27 Claims



1. A device for feedback controlling focus of an optical system in an information recording and/or reproducing apparatus capable of recording and/or reproducing on and/or from information tracks of an optical disk, comprising:

(a) first means for simultaneously imaging first, second and third light spots on one of the information tracks of said optical disk, said first means having a light source and a condenser lens, the optical disk responding to the light spots imaged thereon so first, second and third reflected beams are derived thereby, the first, second and third reflected beams being directed through first, second and third optical paths, each having an optical axis;

(b) optical means in the second optical path responsive to the second reflected optical beam for modifying the intensity of the second optical beam to have an intensity that is a function of the degree of focusing of the second light spot on the information track;

(c) optical detector means responsive to the first and third beam and the modified second beam for deriving multiple signals indicative of the intensity of the second beam and of the positions of the first, second and third light spots relative to the information track;

(d) means responsive to the multiple signals for deriving a focusing error signal and a tracking error signal; and

(e) means responsive to the focusing error signal for controlling the axial position of said condenser lens so as to image the second light spot on said one information track with a predetermined diameter.

4,504,939

STORAGE MEDIUM TRACK PITCH DETECTOR

Carlyle J. Eberly, Long Beach, Calif., assignor to Discovision Associates, Costa Mesa, Calif.

Filed Dec. 10, 1981, Ser. No. 329,462
Int. Cl.[3] G11B 3/82, 3/90
U.S. Cl. 369—46 10 Claims

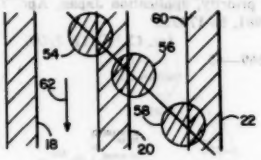
1. Apparatus for measuring variations in the spacing between adjacent information tracks on an optical information recording medium comprising:

light means for projecting a spot of light onto said medium such that at least a portion of said spot impinges a first track, the average amount of light from said spot that emerges from the medium in a predetermined direction being proportional to the fraction of said spot which does not impinge said first track;

photodetector means for providing an electrical signal representative of the amount of the light from said spot

emerging from the medium in said predetermined direction, the value of said signal being proportional to the fraction of said spot not impinging said first track;

tracking means for maintaining a substantially constant lateral spacing of said spot of light from a second track parallel to said first track;



scanning means for providing relative motion between said light means and said medium in a direction parallel to said second track,

whereby the variations in the value of said signal are proportional to variations in the spacing between said first track and said second track; and

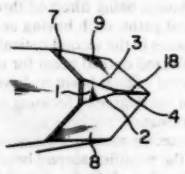
means for measuring the variations in the value of said signal.

4,504,940

STYLUS FOR USE WITH VIDEO DISC AND METHOD OF GRINDING SUCH STYLUS

Takashi Nishiguchi, Tokyo, and Shingo Tamura, Yokohama, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 8, 1983, Ser. No. 483,174
Claims priority, application Japan, Apr. 9, 1982, 57-59129
Int. Cl.³ H04N *5/80*; G11B *9/06*
U.S. Cl. 369—126 **5 Claims**



1. A stylus suitable for use with a video disc player of a type in which signals representing changes in electrostatic capacity with respect to a video disc are detected, comprising:

a scanning surface brought into contact with the video disc for scanning same;

a plurality of inclined surfaces; and

a plurality of ridges formed by said scanning surface and said inclined surfaces;

wherein the improvement resides in that:

at least one of several meeting points of said plurality of ridges located in a direction in which scanning is performed is chamfered to render the point blunt.

4,504,941

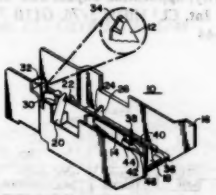
STYLUS CARTRIDGE HAVING STYLUS ARM RESTRAINT

Eric A. Brauer, Danville, Ind., assignor to RCA Corporation, New York, N.Y.

Filed Jan. 28, 1983, Ser. No. 461,892
Int. Cl.³ G11B *1/00, 9/06*
U.S. Cl. 369—170 **3 Claims**

1. In a stylus cartridge including a housing; a stylus arm having an axis and carrying a stylus at one end thereof; a compliant member freely suspending the other end of said stylus arm in said cartridge housing such that said stylus arm is free to move axially, laterally and vertically; a stop having a centering groove arranged substantially parallel to said stylus arm axis; means for biasing said stylus arm in said centering groove to prevent side-to-side and up-and-down motion of said stylus arm; wherein the improvement comprises:

(A) an element disposed on said stylus arm substantially at right angles to its axis; and



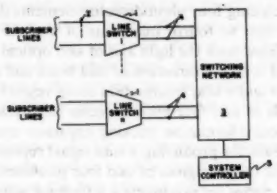
(B) a recess provided in said cartridge housing for receiving a portion of said element when said stylus arm is held against said stop to limit front-to-back excursions of said stylus arm.

4,504,942

LINE SWITCH HAVING DISTRIBUTED PROCESSING

Enn Aro, Delaware; Robert J. DeHilster, Worthington, and Leonard E. Bogan, Columbus, all of Ohio, assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Apr. 22, 1982, Ser. No. 371,053
Int. Cl.³ H04Q *11/04*; H04J *3/02*
U.S. Cl. 370—58 **29 Claims**



1. A telephone switching system comprising:

a system controller;

a switching network;

a first PCM line connected to said switching network;

a first plurality of subscriber lines;

a first line switch connected to said first PCM line and to said first plurality of subscriber lines, said first line switch comprising:

a first processing means for receiving commands from said system controller and for generating responses to said system controller;

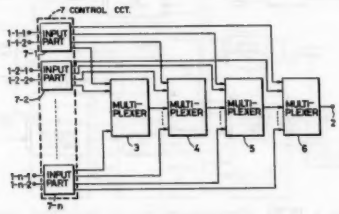
a first group of line circuits connected to a first group of said first plurality of subscriber lines, said first group of line circuits having a second processing means for receiving commands from said first processing means and for controlling said first group of line circuits; and

bus means for exchanging PCM information between said first PCM line and said first group of line circuits and for exchanging control information between said first and second processing means, said PCM information and said control information being time multiplexed.

4,504,943
TIME DOMAIN MULTIPLEXER

Katsuyuki Nagano, Nishitama; Yasushi Takahashi, Hachioji; Yoshitaka Takasaki, Tokorozawa, and Mitsuo Tanaka, Ohme, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 17, 1982, Ser. No. 408,806
Claims priority, application Japan, Aug. 21, 1981, 56/130096
Int. Cl.³ H04J 3/00
U.S. Cl. 370—79 7 Claims



1. In an apparatus for time-dividing a plurality of channel signals including channel signals of unequal bit rates; a time domain multiplexer comprising

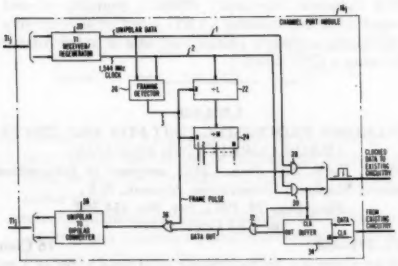
a plurality of channel units each providing an information signal having one of a hierarchy of bit rates, and at least one of which additionally provides a bit rate indicating signal, in response to an applied channel signal; and

multiplexer means connected to said channel units to receive said information signals and said bit rate indicating signal for subjecting information signals from said plurality of channel units to time domain multiplexing, including a plurality of multiplexer units connected in cascade, the degrees of multiplexing of which vary hierarchically in accordance with said hierarchy of bit rates, and control circuit means for selectively applying said information signals to selected multiplexer units in accordance with said bit rate indicating signal so as to multiplex said information signals in accordance with a selected hierarchy of bit rates.

4,504,944
BRIDGING CHANNEL PORT MODULE

Virgil I. Johannes, Holmdel, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed May 13, 1982, Ser. No. 377,718
Int. Cl.³ H04J 3/00
U.S. Cl. 370—84 4 Claims



1. A TDMA interface for establishing communication between a hub office (10) operating at a first data rate (T1) and a plurality of M users each operating at a second data rate, where the first data rate is M times the second data rate, the interface comprising

means (16) responsive to a received first data rate signal from the hub office which comprises succeeding N channel-length frames for separating said received first data rate signal into a plurality of M separate L channel-length second data rate synchronous signals, where ML is equal to N, said means also being responsive to a plurality of M transmit second data rate synchronous signals from the M separate users to form a single first data rate signal which is transmitted back to the hub office

characterized in that

the means comprises a plurality of M channel port modules, each channel port module associated with a separate one of the M users and responsive to the received first data rate signal from the hub office and a separate one of the M synchronous second data rate signals from a separate one of the plurality of M users for extracting from said received first data rate signal an L channel-length second data rate signal destined thereof, and also for inserting an L channel-length return synchronous second data rate signal onto the single first data rate signal transmitted back to the hub office from said means, each channel port module comprises

regenerating means (20) for receiving the first data rate signal from the hub office and generating as separate outputs a received data stream (1) and a clock signal (2) related thereof;

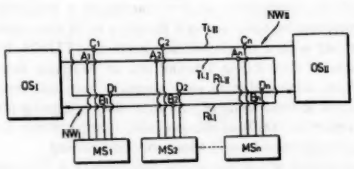
a framing detector (26) responsive to both the received data stream and the clock signal produced by said regenerating means for detecting the beginning of each succeeding frame of the received first data rate signal and generating as an output a frame pulse signal; and

transmission means (22, 24, 28, 30) responsive to both said received data stream and said clock signal generated by said regenerating means and said frame pulse signal generated by said framing detector for generating as separate outs the L channel-length second data rate signal and an L channel-length clock signal destined for the user associated with the channel port module.

4,504,945
COMPUTER NETWORK SYSTEM

Tomoo Kunikyo, Kawasaki, Japan, assignor to Agency of Industrial Science and Technology, Tokyo, Japan

Continuation-in-part of Ser. No. 252,244, Apr. 8, 1981,. This application Nov. 7, 1983, Ser. No. 549,628
Claims priority, application Japan, May 30, 1980, 55-71521
Int. Cl.³ H04J 3/02; H04Q 9/00
U.S. Cl. 370—88 2 Claims



1. A computer network system comprising first and second spacially separated and electrically isolated central stations, each of said central stations having a transmission and a receiving terminal, a continuous closed loop network being provided for each central station, each network at one loop end thereof being connected to the transmission terminal of its associated central station and the other loop end to the receiving terminal of its associated central station, each central station being provided with means for transmitting a vacant time slot and including for this purpose a clock signal generator and a slot signal generator operated under control of signals from said clock generator to produce said vacant time slot for supply to the transmission terminal of the relevant central station, a plurality of member stations, each having two sets of transmission and reception terminals, one set of the transmission and

reception terminals of each member station being connected to one of the closed loop networks in series relation and the other set of said transmission and reception terminals of each member station being connected to the other of the closed loop networks in series relation, the series connection of said one set of the transmission and reception terminals to said one of the closed loops being in inverse relation to the series connection of the other set of the transmission and reception terminals to said other of the closed loops in terms of the physical distance of the member stations from the respective central stations, whereby each of the member stations is adapted for equal access to a vacant time slot transmitted by each central station to enable communication between a member station accessing a vacant time slot and a member station addressed thereby.

4,504,946

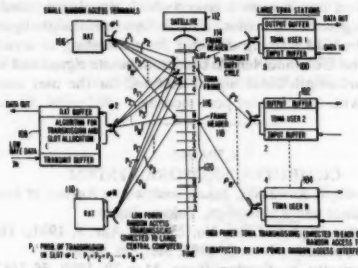
TIME DIVISION MULTIPLE ACCESS COMMUNICATION SYSTEMS

Dipankar Raychaudhuri, Kendall Park, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Jun. 11, 1982, Ser. No. 387,366

Int. Cl.³ H04J *6/02*

U.S. Cl. 370—95 **8 Claims**



1. In a time division multiple access (TDMA) communication system, a plurality of TDMA stations each capable of transmitting and receiving packets of data having an energy level $>E_1$ modulated upon a carrier in a uniquely assigned corresponding time slot in a plurality of N time slots forming, together with a synchronizing header, a TDMA frame, each packet of data being transmitted or received from a given TDMA station during said uniquely assigned time slot and wherein at least some of said time slots are being utilized during less than 100% of the available time, a circuit for utilizing the unused time in said time slots comprising:

a plurality of random access terminals (RATS), each capable of generating and transmitting a packet of data having an energy level $<E_2$ to any given single time slot during each frame and each comprising time slot selecting means for selecting said given single time slot on a predetermined statistical basis, and where E_1 is sufficiently greater than E_2 so that a data packet transmission from a TDMA will completely obscure a data packet transmission from a RAT; and

each of said plurality of RATS further comprising means for receiving packets of data transmitted by any TDMA or any RAT and for verifying the successful or non-successful transmission of any data packet originating from said each RAT and for retransmitting any non-successfully transmitted data packet from said each RAT during a subsequent frame.

4,504,947

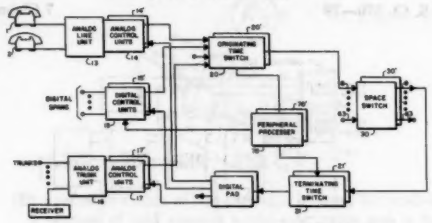
PCM SUPERVISION DATA REFORMATTING CIRCUIT

Thomas J. Perry, Phoenix, Ariz., assignor to GTE Automatic Electric Incorporated, Northlake, Ill.

Filed Jun. 22, 1983, Ser. No. 506,573

Int. Cl.³ H04J *3/00*

U.S. Cl. 370—99 **12 Claims**



1. In a PCM telecommunications switching system connected to a plurality of digital spans, said switching system including a CPU, a PCM supervision data reformatting circuit comprising:

said PCM supervision data including an A and a B supervision bit;

means for receiving said PCM supervision data from each of said plurality of digital spans, said means for receiving connected to each of said digital spans;

time slot counter means connected to said means for receiving and to said CPU, said time slot counter means operated to produce a plurality of time slot signals for indicating an identity of a particular digital span and an identity of a particular channel of said particular digital span for which said means for receiving presently has said PCM supervision data;

means for controlling connected to said means for receiving to said time slot counter means and to said CPU and said means for controlling being operated to cyclically produce a plurality of first signals for indicating which particular digital span of said plurality is available for supervision data reformatting, and said means for controlling further operated to produce a second signal of a first value for said A supervision bit and to produce said second signal of a second value for said B supervision bit;

means for formatting connected to said time slot counter means, to said means for receiving and to said means for controlling, said means for formatting operated in response to a bit-for-bit concurrence of a particular number of said plurality of time slot signals with said plurality of first signals to repeatedly collect a plurality of said A supervision bits forming a CPU word or alternatively to repeatedly collect a plurality of said B supervision bits forming a CPU word.

4,504,948

SYNDROME PROCESSING UNIT FOR MULTIBYTE ERROR CORRECTING SYSTEMS

Arvind M. Patel, San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 29, 1982, Ser. No. 454,392

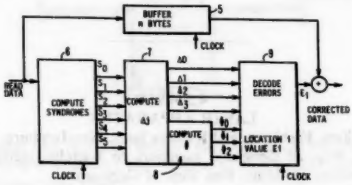
Int. Cl.³ G06F *11/10*

U.S. Cl. 371—38 **16 Claims**

1. In an apparatus for processing syndrome bytes in a multibyte error correcting system of the type wherein each character is represented by a byte consisting of a unique combination of "b" binary bits, and write check bytes are generated as data is being written on a storage medium, and read check bytes are generated when the data is read from the storage medium, and the apparatus is operable to correct up to t errors in a selected codeword containing up to 2^b character positions by processing 2t syndrome bytes, each containing "b" bits

which were generated by combining write check bytes and read check bytes that correspond to the modulo 2 sum of bit positions of said codeword that were selected systematically in accordance with a parity check matrix reflecting the roots α^a, α^{a+1}, α^{a+2}, . . . , α^{a+2t-1} of a generator polynomial where α is an element of the finite field of 2^b elements, the combination comprising:

(1) syndrome generating means for generating 2t syndrome bytes from said selected codeword as it is read from the storage medium; and



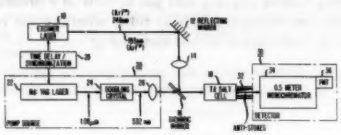
(2) circuit means responsive to said 2t syndrome bytes for developing t+1 coefficients Δ for an error locator polynomial corresponding to said selected codeword, said circuit means being characterized by logic means responsive to predetermined combinations of said syndrome bytes to produce cofactors corresponding to coefficients Δ of the error locator polynomial when less than t errors occur, and combining circuitry for selectively combining said cofactor signal when t errors occur.

4,504,949

STIMULATED ANTI-STOKES RAMAN UP-CONVERTER

Jonathan C. White, Lincroft, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Sep. 22, 1982, Ser. No. 421,045
Int. Cl.³ H01S *3/30*
U.S. Cl. 372—3 **11 Claims**



1. An anti-Stokes Raman up-converter comprising

a metal-halide Raman lasing medium including a ground state, an intermediate state, and at least one metallic metastable state;

means for photodissociating said metal-halide Raman lasing medium and creating a population inversion in a metastable state of the metallic atom; and

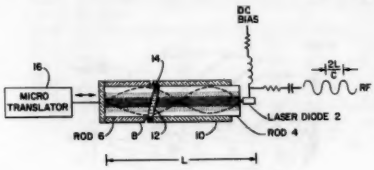
a pump source capable of producing a lasing output at a first frequency, said metallic atom population inversion responsive to the pump source lasing output for moving said metallic atom population inversion from said metastable state to a virtual state near said intermediate state and producing as an output anti-Stokes Raman lasing emission at a second frequency, wherein said second frequency is greater than said first frequency.

4,504,950

TUNABLE GRADED ROD LASER ASSEMBLY

John C. AuYeung, Alhambra, Calif., assignor to California Institute of Technology, Pasadena, Calif.

Filed Mar. 2, 1982, Ser. No. 353,903
Int. Cl.³ H01S *3/10*
U.S. Cl. 372—20 **14 Claims**



1. A tunable laser including

an active laser medium;

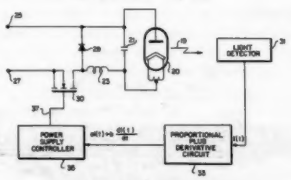
means incluidng a pair of radially graded indexed optical segments aligned with and capable of focusing the laser to form an external resonant cavity with an optical axis, the respective optical segments being relatively movable along said optical axis to provide a variable etalon gap of dimensions sufficient to permit a variable tuning of the laser wavelength without altering the effective length of the resonant cavity.

4,504,951

HIGH SPEED SWITCHING POWER SUPPLY FOR A LIGHT CONTROLLED LASER SYSTEM

William H. McMahan, and Steve H. Holtman, both of Salt Lake City, Utah, assignors to American Laser Corporation, Salt Lake City, Utah

Filed Jun. 1, 1982, Ser. No. 383,600
Int. Cl.³ H01S *3/10*
U.S. Cl. 372—38 **12 Claims**



1. A power system for a laser comprising:

power supply means for applying a voltage across said laser;

detector means for sensing a feedback parameter of said laser and for providing a detector signal having an amplitude which varies as a function of the laser beam intensity;

proportional-plus-derivative circuit means responsive to said detector signal for providing a proportional-plus-derivative signal having an amplitude which is proportional to the sum of the amplitude of the detector signal and the time rate-of-change of the amplitude of the detector signal; and

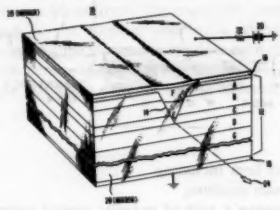
control circuit means responsive to said proportional-plus-derivative signal for varying the voltage applied across said laser as a function of the amplitude of said proportional-plus-derivative signal.

4,504,952

STRIPE-GUIDE TJS LASER

Robert L. Hartman, Warren; Louis A. Koszi, Scotch Plains, and Bertram Schwartz, Westfield, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jun. 1, 1982, Ser. No. 383,778
Int. Cl.[3] H01S 3/19, 3/18
U.S. Cl. 372—45 10 Claims



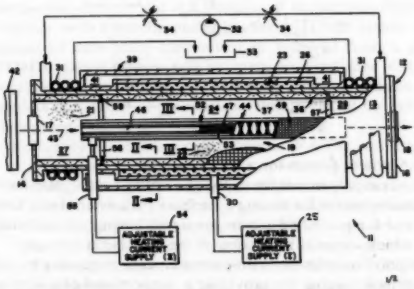
1. In a light emitting device, a body comprising
a first semiconductor region of one conductivity type,
a relatively narrow bandgap layer constituting said first region and a pair of wider bandbap cladding layers bounding said narrow bandgap layer, said layers all being of said one conductivity type,
a groove which penetrates said first region,
a second semiconductor region at the bottom of said groove, said second region having a second conductivity type and a bandgap different from that of said first region, thereby forming a p-n junction along the edges of said groove effective to inject carriers from one of said regions into the other when said junction is forward biased, radiative recombination of said carriers occurring in said other region, and
electrode means for forward biasing said p-n junction.

4,504,953

APPARATUS FOR GENERATING COHERENT INFRARED ENERGY OF SELECTED WAVELENGTH

Charles G. Stevens, Danville, Calif., assignor to The United States of America as represented by the Department of Energy, Washington, D.C.

Filed Feb. 1, 1983, Ser. No. 462,819
Int. Cl.[3] H01S 3/00
U.S. Cl. 372—56 14 Claims



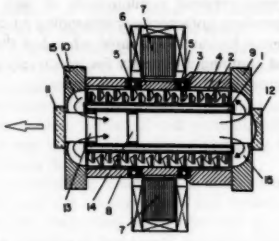
1. In an infrared energy source having a heat pipe forming a chamber which includes first and second end regions and an intermediate region therebetween, said chamber containing a quantity of an alkali metal and a quantity of a buffer gas which is non-reactive with said alkali metal, first heating means for heating said alkali metal at said intermediate region of said chamber to a first temperature at which said metal vaporizes, means for cooling said end regions of said chamber to condense said alkali metal vapor therein, means for returning the condensed vapor from said end regions to said intermediate region, and optical pumping means for directing radiant energy into said metal vapor to stimulate emission of said infrared energy, the improvement comprising:
a tubulation extending within said intermediate region of said chamber;
second heating means for raising the temperature of vapor within said tubulation to a second higher temperature at which dimers in said vapor are dissociated; and
means for directing said radiant pumping energy into said tubulation.

4,504,954

LASER APPARATUS

Karl Güers, Eschborn, and Rasmus Beck, Neu-Isenburg, both of Fed. Rep. of Germany, assignors to Battelle-Institut e.V., Frankfurt am Main, Fed. Rep. of Germany

Filed May 28, 1982, Ser. No. 383,256
Claims priority, application Fed. Rep. of Germany, May 29, 1981, 3121372; Sep. 29, 1981, 3138622
Int. Cl.[3] H01S 3/03
U.S. Cl. 372—61 13 Claims



1. A laser apparatus, for convection gas cooling including a casing enclosing a gas circulation and excitation system, comprising: a laser tube;
a pair of electrodes in said laser tube;
a circulation turbine disposed concentrically about said laser tube; said circulation turbine, during rotation of said circulation turbine causing said gas to flow in a predetermined direction through said laser tube, whereby gas recirculation is maintained within said casing.

4,504,955

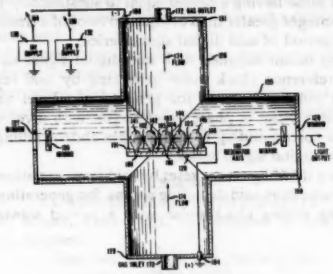
LOW VOLTAGE OPERATION OF ARC DISCHARGE DEVICES

John J. Macklin, Highlands; William T. Silfvast, Holmdel, and Obert R. Wood, II, Little Silver, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Aug. 13, 1982, Ser. No. 408,006
Int. Cl.[3] H01S 3/097
U.S. Cl. 372—76 19 Claims

1. An arc discharge light source comprising:
excitation means for producing radiation;
said excitation means comprising at least two strips having at least one gap, which at least one gap provides at least one intervening discharge path; and means for applying an electrical signal to said at least two strips;
at least a portion of said at least two strips being fabricated from a material which is converted into a plasma of ions as

a result of the application of said electrical signal, which plasma generates said radiation; characterized in that



at least one thin film bridges each of said at least one gap, thereby reducing the voltage of said signal required to initiate said plasma.

4,504,956

LASER RESONATOR CAVITY

Stanley L. Ream, Columbus, Ohio, assignor to Laser Manufacturing Technologies, Inc., Columbus, Ohio

Filed Sep. 29, 1982, Ser. No. 427,974
Int. Cl.³ H01S *3/08*
U.S. Cl. 378—107 **6 Claims**

1. A laser resonator cavity comprising:
(a) a resonant cavity containing an optically active medium capable of a population inversion;
(b) a plurality of mirrors rigidly mounted with respect to each other at one end of said cavity;
(c) a means for reflecting light beams incident upon said reflecting means in a direction antiparallel to said incident light beams, mounted at the opposite end of said cavity, positioned to reflect light beams toward said rigidly mounted mirrors;
(d) a means for detecting deviations in the relative orientation of said reflecting means and said rigidly mounted mirrors;
(e) a means for correcting the relative orientation of said reflecting means and said rigidly mounted mirrors.

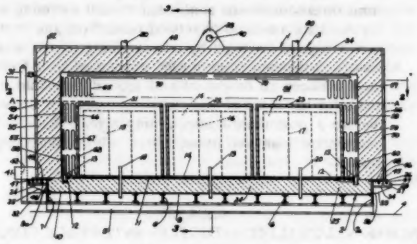
4,504,957

HIGH TEMPERATURE BOX ANNEALING FURNACE

John R. McClelland, Butler, Pa.; Wade S. Wright, Fairfield, Ohio; Edward P. Diamond, Nashport, Ohio; Leroy C. Pryor, Chandlersville, Ohio, and Douglas R. Olson, Ashland, Ky., assignors to Armco Inc., Middletown, Ohio

Filed Oct. 20, 1982, Ser. No. 435,338
Int. Cl.³ F27B *9/00*
U.S. Cl. 373—130 **19 Claims**

1. In a high temperature box annealing furnace for metallic coil annealing practices, and of the type having a fixed base and a removable bell having side walls, end walls and a roof and being capable of achieving a sealed relationship with said base, the improvement comprising a lining of ceramic fiber insulation on the inside surfaces of said bell side walls, end walls and roof, a plurality of heating elements mounted on said bell roof adjacent the inside surface of said ceramic fiber insulation lining thereon, a plurality of heating elements mounted on said bell side and end walls adjacent the inside surface of said ceramic fiber insulation lining thereon, said heating elements being divided into separately controllable zones, said furnace



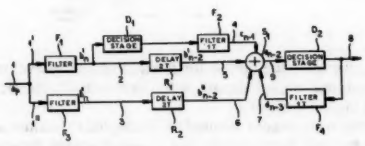
base comprising a metallic framework supporting a cast refractory base member having a substantially planar horizontal upper surface to directly support at least one coil.

4,504,958

EQUALIZER FOR THE CORRECTION OF DIGITAL SIGNALS

Giovanni Tamburelli, Turin, Italy, assignor to CSELT - Centro Studi e Laboratori Telecomunicazioni S.P.A., Turin, Italy

Filed Dec. 10, 1982, Ser. No. 448,741
Claims priority, application Italy, Jan. 15, 1982, 67039 A/82
Int. Cl.³ H04B *3/14*
U.S. Cl. 375—12 **7 Claims**



1. An equalizer for eliminating the effects of postcursor and precursor interference from a periodically sampled train of incoming digital signals, comprising:
receiving means connected to a transmission path carrying said incoming signals;
a first circuit branch connected to said receiving means, said first branch including first upstream filter means for converting a given signal sample into a first linearly prefiltered signal with at least partial suppression of postcursor effects, first threshold means connected to said first upstream filter means for deriving a first quantized pulse from said first prefiltered signal, first downstream filter means connected to said first threshold means for generating a precursor-compensating signal from said first quantized pulse, and first delay means connected in parallel with said first threshold means to said first upstream filter means for emitting a first retarded signal corresponding to said first prefiltered signal;
a second circuit branch connected in parallel with said first circuit branch to said receiving means, said second branch including second upstream filter means for converting said given signal sample into a second linearly prefiltered signal with at least partial suppression of precursor effects, said second branch further including second delay means connected to said second upstream filter means for emitting a second retarded signal corresponding to said second prefiltered signal, the retardations introduced by said first and second delay means being identical and exceeding by one sampling period a lag introduced by the series combination of said first threshold means and said first downstream filter means;

summing means with inputs connected to said first and second delay means and to said first downstream filter means for receiving said first and second retarded signals and said precursor-compensating signal therefrom;

second threshold means connected to said summing means for deriving a second quantized pulse from the combination of signals received by said summing means; and

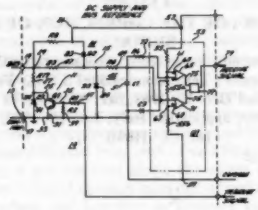
second downstream filter means connected in a feedback loop between an output of said second threshold means and a further input of said summing means for delivering thereto a postcursor-compensating signal, derived from said second quantized pulse, with a delay of one sampling period.

4,504,959

NOISE-NEUTRALIZING DIGITAL INTERFACE CIRCUIT

Terry A. Heckenbach, Middlebury, Ind., assignor to Johnson Service Company, Milwaukee, Wis.

Filed Feb. 25, 1983, Ser. No. 469,930
Int. Cl.³ H04L 5/14
U.S. Cl. 375—36 **6 Claims**



1. An interface circuit for facilitating the reception of bus-transmitted digital signals in the presence of electrical noise, said circuit including:

transmitter means adapted to be coupled to a communication bus and having controllable switch means for generating digital output signals to be transmitted to said bus;

receiving means adapted to be coupled to said communication bus for receiving digital input signals defining a first wave form and transitory between a first voltage and a second voltage;

said receiving means including first conditioning means for shaping said first wave form to a second wave form;

means for detecting said second wave form and providing a first output condition at an output terminal when said second wave form transcends through a first intermediate voltage between said first and second voltage in a first transition direction and for providing a second output condition at said output terminal when said second wave form transcends through a second intermediate voltage between said first and second voltage in a second transition direction, said interface circuit thereby neutralizing spurious electrical signals of a first type having a maximum amplitude less than the voltage difference between said intermediate voltages.

4,504,960

DATA READING APPARATUS FOR DATA TRANSMISSION

Yasuhiro Yamada, Fussa, Japan, assignor to Victor Company of Japan, Ltd., Yokohama, Japan

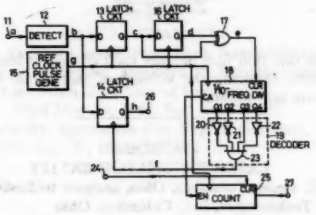
Filed Jul. 14, 1982, Ser. No. 398,366
Claims priority, application Japan, Jul. 17, 1981, 56-111652
Int. Cl.³ H04L 7/06
U.S. Cl. 375—94 **4 Claims**

1. A data reading apparatus for data transmission, for reading digital data from a digital signal series obtained by comparing the level of an incoming transmission signal obtained through a transmission path with a reference level at a detector, said data reading apparatus comprising:

a reference clock pulse generator for generating a reference clock pulse having a period equal to substantially 1/M (M is an integer greater than or equal to two) of a transmission digit period of said digital signal series;

detecting means supplied with said digital signal series and said reference clock pulse generated by said reference clock pulse generator, for generating a level variation detection pulse in phase synchronism with level varying points corresponding to rising edges and/or falling edges of said digital signal series;

frequency dividing means reset by said level variation detection pulse from said detecting means, for generating a data reading timing clock pulse with a period substantially



equal to the digit period of said digital signal series and with a phase delayed with respect to said level variation detection pulse, by frequency-dividing said reference clock pulse from said reference clock pulse generator; and

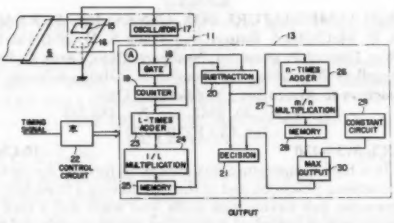
a data reading circuit for obtaining a data reading output signal by latching said digital signal series by said data reading timing clock pulse obtained from said frequency dividing means, said frequency dividing means comprising phase controlling means for generating said data reading timing clock pulse variably controlled of a phase delay quantity with respect to said level variation detection pulse, according to a value of the data reading output signal in a digit immediately preceding a digit from which the data reading output signal of said digital signal series is obtained.

4,504,961

PLURAL-SHEET DETECTOR

Satoru Horiguchi, Saitama, Japan, assignor to Dai Nippon Insatsu K.K., Tokyo, Japan

Continuation of Ser. No. 254,463, Apr. 15, 1981, abandoned.
This application Dec. 22, 1983, Ser. No. 565,121
Claims priority, application Japan, Apr. 19, 1980, 55-51105
Int. Cl.³ G06M 7/06
U.S. Cl. 377—8 **2 Claims**



1. a plural-sheet detector for detecting a number of the sheet-shaped materials piled one on another as a number of serial pulse signals, which comprises:

means for providing, whenever said serial pulse signals are

detected, a count value thereof; means averaging said count values a predetermined number of times for producing a reference count value,

means for providing a deviation value representative of the difference between said count value and a reference count value; and

decision means for comparing said deviation value with a reference comparison value,

so that when said deviation value exceeds said reference comparison value, the number of sheet-shaped materials piled one on another is determined to be unacceptable.

4,504,962

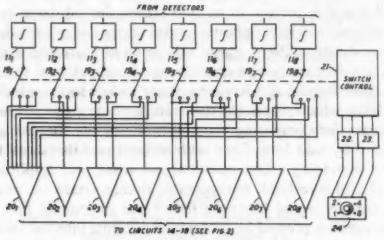
COMPUTERIZED TOMOGRAPHY

John F. Moore, Lake Bluff, Ill., assignor to EMI Limited, Hayes, England

Filed Dec. 22, 1978, Ser. No. 972,391

Int. Cl.³ G03B *41/16*

U.S. Cl. 378—19 **10 Claims**



1. A computerized tomography method comprising the steps of providing a plurality of detector devices distributed around a patient position, projecting a substantially planar, fan-shaped distribution of X-radiation through a sectional slice of the body of a patient, disposed at said patient position, from many different positions distributed angularly around said patient position, causing said detector devices to provide electrical output signals indicative of the radiation emerging from said slice of the body of a patient along a plurality of mutually divergent directions from each of said positions, providing a processor, and selectively passing, to said processor, individual electrical output signals provided by individual detector devices or combination electrical signals generated by combining the electrical output signals provided by respective groups of neighboring detector devices, the numbers of devices in such groups being selectable, and causing said processor to process the signals selectively passed to the processor to generate, in part from said electrical output signals or combination electrical signals selectively passed thereto, electrical data signals indicative of the attenuation suffered by the X-radiation passing through the slice along various directions and to generate, in part from said electrical data signals, a representation of the variation of an X-ray response characteristic over said slice.

4,504,963

AUTOMATICALLY CALIBRATING MEAT ANALYSIS DEVICE

Lloyd D. Johnson, 2850 Cedar St., Davenport, Iowa 52804

Filed Apr. 14, 1983, Ser. No. 484,873

Int. Cl.³ G01N *23/00*

U.S. Cl. 378—53 **32 Claims**

1. A system for analyzing the quantitative relationship of components of meat, such as the weight percent of fat thereof, comprising:

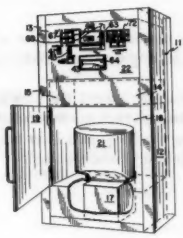
means for serially transmitting a first, second and third incident beam of X-ray radiation respectively through a first calibration standard, a second calibration standard and an unknown sample, for respectively absorbing a portion of the radiation by the first calibration standard, the second calibration standard and the unknown sample;

means for serially detecting the radiation respectively not absorbed by the first calibration standard, the second calibration standard and the unknown sample, and for converting the respective detected radiation to a first calibration digital electrical signal, a second calibration digital signal and an unknown sample digital signal;

means for monitoring the intensity of the incident beam and for converting the resulting incident beam monitor signal to a monitor digital electrical signal;

first data channel circuit means for operating on said first calibration digital electrical signal and on said monitor digital electrical signal to provide a first data channel output;

second data channel circuit means for operating on said second calibration digital electrical signal and on said monitor digital electrical signal to provide a second data channel output;



third data channel circuit means for operating on a pair of signals corresponding to known component quantities of said first calibration standard and of said second calibration standard to provide a third data channel output;

combination data circuit means for operating on the first data channel output, the second data channel output, the third data channel output and one of the pair of signals corresponding to known component quantities of the calibration standards in order to develop calibration constant digital signals, whereby the various circuitry of the system is generally positioned for transition of the system from its calibrate mode to its operate mode;

fourth data channel circuit means for operating on said unknown sample digital signal and on said monitor digital electrical signal to provide a fourth data channel output;

unknown sample data channel circuit means for operating on said fourth data channel output and on said calibration constant digital signals in order to provide a resultant digital signal; and

means for displaying said resultant signal as a component weight percent of the unknown sample being analyzed.

4,504,964

LASER BEAM PLASMA PINCH X-RAY SYSTEM

Louis Cartz, Milwaukee, Wis.; Arnold Weiss, Minneapolis, Minn.; Herman P. Schutten, Milwaukee, Wis.; Gordon B. Spellman, Mequon, Wis.; Stanley V. Jaskolski, Sussex, Wis., and Peter H. Wackman, deceased, late of Wauwatosa, Wis. (by Connie M. Wackman, personal representative), assignors to Eaton Corporation, Cleveland, Ohio

Filed Sep. 20, 1982, Ser. No. 420,557

Int. Cl.³ G21G *3/00*

U.S. Cl. 378—119 **20 Claims**

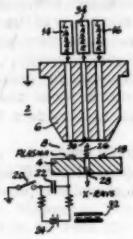
1. A method for producing X-rays comprising:

generating plasma directly from solid material by laser beam impingement; and

generating X-rays by passing high current rectilinearly axially through said plasma causing radially inward magnetic field plasma pinching perpendicularly to the rectilinear

axial current flow, the X-ray emitting plasma pinched region being at a different location than and spaced radially inwardly of the laser beam impingement location, said laser beam being directed in an axial path parallel to or colinear with the current axis.

17. A method for producing X-rays comprising:



initially generating plasma directly from solid material by axial laser beam impingment at radially spaced locations; and

subsequently generating X-rays by passing high current axially through said plasma causing radially inward magnetic field plasma pinching, said laser beam impingement occuring prior to said plasma pinching.

4,504,965

ROTARY ANODE X-RAY TUBES

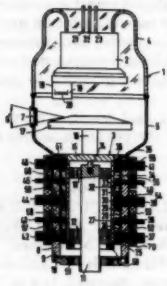
Hans Ebersberger, Markt Erlbach, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Dec. 7, 1982, Ser. No. 447,700

Claims priority, application Fed. Rep. of Germany, Dec. 16, 1981, 3149936

Int. Cl.³ H01J *35/04, 35/10*

U.S. Cl. 378—132 **6 Claims**



1. A rotary anode X-ray tube comprising a tube envelope having magnets disposed at the exterior thereof, and a magnetically mounted rotary anode within said tube envelope and rotatably journalled by means of said magnets, characterized in that magnetically conductive pole pieces are inserted in the wall of the tube envelope at the locations at which said magnets are disposed at the exterior for providing a magnetic flux path of magnetic material for coupling of said magnets with said rotary anode.

4,504,966

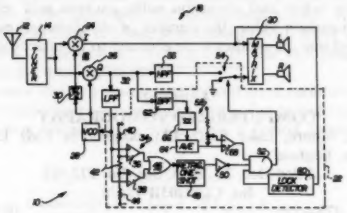
STEREO INHIBITOR FOR AM STEREO RECEIVER

David L. Hershberger, Quincy, Ill., assignor to Harris Corporation, Melbourne, Fla.

Filed May 31, 1983, Ser. No. 499,551

Int. Cl.³ H04H *5/00*

U.S. Cl. 381—15 **5 Claims**



1. Apparatus for use in an AM stereo demodulator having monophonic and stereophonic modes of operation and adapted to demodulate a QAM signal whose quadrature-phase signal has a low frequency slot containing substantially no information signal therein, and having a phase locked loop including a loop filter which filters the quadrature-phase signal, comprising means for comparing the amplitude of the filtered signal provided by said loop filter with at least one threshold level and for providing a first output signal when said amplitude is beyond said threshold, retriggerable timing means for providing a control signal having a first value as long as said first output signal is present and for a selected time interval thereafter and a second value otherwise, and means for holding said AM stereo demodulator in said monophonic mode when said control signal has said first value, regardless of whether the signal then being demodulated by said demodulator is a monophonic signal or a stereophonic signal.

4,504,967

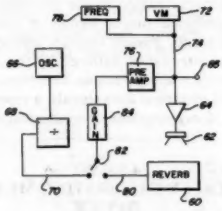
METHOD AND APPARATUS FOR DAMPING SPURIOUS VIBRATION IN SPRING REVERBERATION UNITS

C. J. Alongi; Jack L. Miller, and William W. Radzik, all of St. Charles, Ill., assignors to The Marmon Group, Inc., Chicago, Ill.

Filed Dec. 16, 1982, Ser. No. 450,325

Int. Cl.³ H03G *3/00;* **H04B** *15/00*

U.S. Cl. 381—65 **28 Claims**



1. A method for locating and damping resonant zones caused by acoustic feedback in a spring reverberation unit having a housing comprising the steps of:

(a) placing said spring reverberation unit in an environment so that acoustic pressure waves impact upon said unit causing an output signal from said unit;

(b) increasing the gain of said output signal from said spring reverberation unit until said unit is driven to a state of self sustaining oscillation;

(c) measuring the level of gain necessary in step (b);

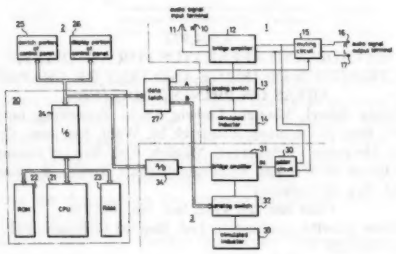
(d) placing sound damping material onto said housing;
(e) increasing the gain of said output signal from said spring reverberation unit until said unit is again driven to a state of self sustaining oscillation;
(f) measuring the level of gain necessary in step (e);
(g) changing the location of said sound damping material on said housing of said spring reverberation unit;
(h) repeating steps (e), (f), and (g);
(i) placing said sound damping material at the location at which the level of gain of said output signal from said spring reverberation unit was greatest.

21. An improved spring reverberation unit comprising a housing having an inner channel and an outer channel, said inner channel being suspended within said outer channel by spring absorbing means, said inner channel having electromechanical transducing driver means and an electrical input terminal connected to said driver means, mechanical-electric transducing pickup means and an electrical output terminal connected to said pickup means, and at least one spring mechanically connected at one end to said driver means and at the other end to said pickup means, said driver means operating to move said spring in response to an audio frequency signal being present at said electrical input terminal, said spring transferring said energy along its length from said driver means to said pickup means, said pickup means generating an output signal on said electrical output terminal in response to said movement of said spring, wherein the improvement comprises:
sound damping material secured to said outer channel of said spring reverberation unit at the location of the resonance zones of said outer channel.

4,504,968
EQUALIZER APPARATUS HAVING TWO DIMENSIONAL DISPLAY

Akio Kaneko; Hitoshi Kajiwara; Yukihiko Haikawa, and Kazuya Nishiga, all of Iwaki, Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan

Filed Aug. 5, 1982, Ser. No. 405,347
Claims priority, application Japan, Aug. 5, 1981, 56-121818
Int. Cl.³ H03G *5/02*; G01R *23/165*
U.S. Cl. 381—103 **4 Claims**

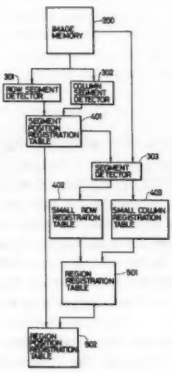


1. An equalizer apparatus for controlling frequency characteristics of an audio signal, including means for generating a plurality of digital data signals corresponding to the desired frequency characteristics of a plurality of audio bands of said audio signal, means including a memory for storing selected data signals, means including an analog switch receiving said data signals produced concurrently by said generating means or said data signals from said memory, as desired, for adjusting frequency characteristics of each of a plurality of bands of said audio signal to produce an output signal adjusted for each of said audio bands, display means receiving the selected data signals for producing a two-dimensional display illustrating the frequency characteristics for each of the audio bands of said adjusted output signal, and level-indicating means receiving said adjusted output signal for selectively displaying the signal level of each audio band of said adjusted output signal by said display means, said level-indicating means including a sample circuit receiving said adjusted output signal and providing a plurality of serial output signals each limited to the frequency band of a respective one of said audio bands, means including a single analog-to-digital converter for receiving said output signals in series and producing digital level signals, means including a memory for receiving said digital level signals and selectively applying them to said display means for producing a visual display of the level of each audio band in said adjusted audio signal, said sample circuit including a plurality of filters each adapted to pass a selected band of said audio signal, and means for serially connecting said filters in said sample circuit.

4,504,969
RECTANGULAR PATTERN RECOGNITION APPARATUS

Isao Suzuki; Yoshio Arai, and Hiroyuki Kataoka, all of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Mar. 11, 1982, Ser. No. 357,123
Claims priority, application Japan, Mar. 12, 1981, 56-34630
Int. Cl.³ G06K *9/00*
U.S. Cl. 382—10 **9 Claims**

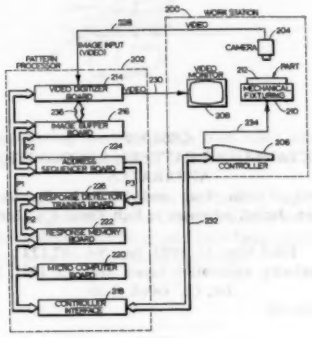


1. A rectangular pattern recognition apparatus, comprising:
an image memory for storing picture element information obtained by scanning an original document on which is drawn at least one solid line rectangular pattern composed of two sets of parallel solid segments aligned in row and column directions, respectively, means for detecting line segments aligned in said row and column directions, means for the registration of segment positions in said row and column directions, small row region registration means for defining small regions divided by the registered row and column segments and for registering continuous small regions divided by solid lines in regions divided by adjacent row segments, small column registration means for registering continuous small regions divided by solid lines in regions divided by adjacent column segments, and region registration means for registering continuous small regions registered in common in said small row and column region registration means as being contained in a common rectangular form.

4,504,970
TRAINING CONTROLLER FOR PATTERN PROCESSING SYSTEM

Larry J. Werth, Eagan, and Larry G. Paulson, Moundsview, both of Minn., assignors to Pattern Processing Technologies, Inc., Minneapolis, Minn.

Filed Feb. 7, 1983, Ser. No. 464,350
Int. Cl.³ G06K 9/70
U.S. Cl. 382—14 11 Claims



1. A pattern processing system comprising:

addressable means for providing an input value representative of a pattern in response to an address;

address sequencer means for providing an address stream containing at least one sequence of addresses in which each address of the sequence is determined by a preceding address and the input value provided by the addressable means in response to the preceding address so that the sequence contains an address loop which characterizes the pattern;

read/write response memory means for storing codes in addressable locations, the response memory being addressable by the address stream to permit writing of the codes into addressed locations and to permit reading of the codes from addressed locations;

means for providing a training code to be associated with the pattern during a training mode;

means for providing a mode select signal which selects the training mode;

training controller means for causing the training code to be written into selected addressable locations of the response memory means during the training mode, the training controller means comprising:

means for storing the training code;

means for counting addresses in the sequence;

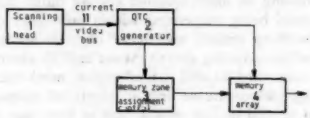
means for causing the stored training code to be written into an addressed location of the response memory means when the mode select signal has selected the training mode and a predetermined number of addresses have been counted; and

means for resetting the count of addresses when the stored training code has been written into the response memory means.

4,504,971
PROCESS AND DEVICE FOR THE AUTOMATIC SEGMENTATION OF A SCANNED IMAGE IN AN IMAGE PATTERN RECOGNITION SYSTEM

Morton Nadler, 17 Les Huppes, 78170 La Celle Saint Cloud, France

Filed Apr. 21, 1982, Ser. No. 370,360
Claims priority, application United Kingdom, Apr. 25, 1981, 8112809
Int. Cl.³ G06K 9/46
U.S. Cl. 382—26 14 Claims

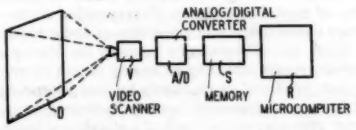


1. A pattern recognition system comprising scanning means (1) for producing a binary signal indicative of the state of the elementary areas in successively scanned columns of elementary areas and segmentation means to separate from said signal data relating to individual discrete graphic objects in a scanned pattern and to store the separated data in individual storage zones of a memory array, wherein said segmentation means comprises a QTC generator (2) for producing quasitopological codes indicative of predetermined inked and uninked states of successive elementary areas using the data in the signal of each successive scanned column and the data in the signal of the last previously scanned column, and for produced a start and a stop signal at the beginning and end of all series of data corresponding to inked fragments made of adjacent inked areas in a graphic object, successive codes given in a column being different depending on whether an inked fragment detected in the signal is or is not continued from last previously scanned column, and assignment control means (3) for assigning any said series of data to a selected memory zone of memory array (4) depending on codes alloted at the beginning and end of the fragment, and controlling the delivery of said series of data to said selected memory zone.

4,504,972
METHOD AND APPARATUS FOR AUTOMATIC RECOGNITION OF IMAGE AND TEXT OR GRAPHICS AREAS ON PRINTED MASTERS

Wolfgang Scherl, Munich; Ludwig Abele, Proecking, both of Fed. Rep. of Germany; Friedrich M. Wahl, San Jose, Calif., and Hermann Fuchsberger, Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Jan. 26, 1982, Ser. No. 342,898
Claims priority, application Fed. Rep. of Germany, Feb. 27, 1981, 3107521
Int. Cl.³ G06K 9/36
U.S. Cl. 382—51 8 Claims



1. A method for automatically recognizing and distinguishing between image areas and text or graphics areas a printed master comprising the steps of:

optoelectronically scanning said printed master and generating analog signals representing the information contained on said printed master;

assigning a first binary value to analog signals having a value above a preselected value and assigning a second binary value to analog signals falling below said preselected value;

storing said binary values in a data field in a memory;

dividing said data field into a grid consisting of a plurality of windows in said memory, said windows having edge lengths which are not less than the spacing between two lines of text on said printed master;

generating four different length of run histograms for each said window; and

analyzing said length of run histograms for deriving values therefrom for determining whether the window associated therewith represents a text or graphics area or an image area of said printed master.

4,504,973

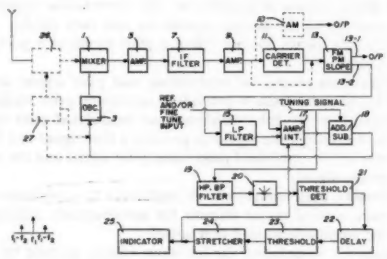
AUTOMATIC DISABLING OF AFC/AFT CONTROLLER DURING RECEIVER CIRCUIT TUNING

Georges E. April, Montreal, Canada, assignor to AED Satellite Systems, Ltd., Canada

Filed Mar. 2, 1984, Ser. No. 585,874

Int. Cl.³ H04B *1/26*

U.S. Cl. 455—192 **7 Claims**



1. An electromagnetic wave receiver system for processing a received signal, said received signal having an average frequency value, and having automatic frequency control-/automatic frequency tuning (AFC/AFT) control means and adjustable tuning means for setting a tuned frequency value;

said AFC/AFT control means comprising:

means for determining the average frequency value of a received signal; and

means for detecting whether the average frequency value is equal to the tuned frequency value of the receiver, comprising, amplifier/integrator (AMP/INT) means having one input thereof connected to an output of said means for determining the average frequency value of the received signal, and a second input thereof connected to a reference signal representative of said tuned frequency value;

means for automatically disabling said AFC/AFT control means when the tuning means is being adjusted;

said means for automatically disabling comprising:

sensor means for sensing when the tuning means is being adjusted and for generating an electric signal when such adjusting is sensed;

means for applying said electric signal to said means for detecting whether the average frequency value is equal to the tuned frequency value of said AFC/AFT control means to thereby disable said AFC/AFT control means by forcing the output of said AMP/INT to a predetermined value which is a function of the reference signal.

4,504,974

OPTO-ELECTRONIC REPEATER

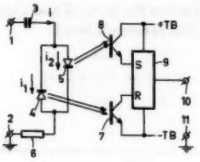
Gerrit Rademaker, Hilversum, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 155,915, Jun. 3, 1980, abandoned. This application Oct. 3, 1983, Ser. No. 537,554

Claims priority, application Netherlands, Jun. 6, 1979, 7904413

Int. Cl.³ H04B *9/00*

U.S. Cl. 455—601 **2 Claims**



1. A repeater comprising:

a source of information signals,

a radiation-emitting element,

a radiation-sensitive element said radiation sensitive element being electrically isolated from said radiation-emitting element but responsive to radiation emanating from said radiafion emitting element,

first means coupled to said radiation emitting element for generating first control signals for said radiation emitting element from said source of information signals said first control signals having a smaller duty cycle than said information signals, said radiation-sensitive element responsive to said first control signals and generating second control signals which are electrically isolated from said first control signals,

said repeater further comprises a first input terminal for receiving said information signals, said first means comprises a D-type trigger circuit, an inverter circuit, an exclusive OR-gate, a first and a second AND-gate and a second input terminal for receiving a clock signal,

said first input terminal is connected to a D-input of said trigger circuit, to a first input of said first AND-gate, to an input of said inverter circuit, and to a first input of said exclusive OR circuit,

said output of said inverter circuit is connected to a first input of said second AND-gate,

said second input terminal is connected to the clock input of said trigger circuit, and

an output of said trigger circuit is connected to a second input of said exclusive OR-gate, and an output of said exclusive OR-gate is connected to a second input of said first and second AND-gates and an output of said first and second AND-gates is coupled to said radiation-emitting element.

4,504,975

SYSTEM FOR TRANSMITTING DIGITAL SIGNALS OVER AN OPTICAL FIBER

Bertrand Jarret; Rose Cordier, and Gérard Buffa, all of Conflans-Ste-Honorine, France, assignors to Lignes Telegraphiques et Telephoniques-L.T.T., Conflans-Ste-Honorine, France

Filed Jan. 11, 1983, Ser. No. 457,224

Claims priority, application France, Jan. 15, 1982, 82 00611

Int. Cl.³ H04B *9/00*

U.S. Cl. 455—608 **8 Claims**

1. A system for transmitting at least one digital signal over an optical fiber, comprising:

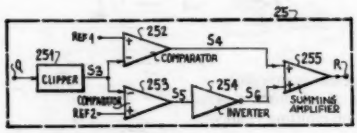
a transmitter of light radiation into said optical fiber, comprising switching means receiving a modulation signal and being controlled by said digital signal to be transmitted,

and a light source emitting said radiation into the fiber and being connected to said switching means;

a receiver of said light radiation after propagation in the fiber, comprising means for converting said radiation into an electic signal, and a device for restoring the digital signal connected to said converting means, said restoring device including;

means for clipping said electric signal, generating a clipped signal;

a first differential amplifier for comparing the level of said clipped signal with a first reference level, generating a first signal when the level of said clipped signal is lower than said first reference level;



a second differential amplifier for comparing the level of said clipped signal with a second reference level, generating a second signal when the level of said clipped signal is greater than said second reference level, said first and second reference levels being respectively on the positive inputs of said first and second differential amplifiers and being different from each other and being determined symmetrically with respect to a predefined level;

inverting means connected at the output of one of said differential amplifiers having the highest reference level; and

means for summing the signals generated by one of said differential amplifiers and said inverting means, generating said digital signal.

4,504,976

DEVICE FOR REGULATING A LASER DIODE

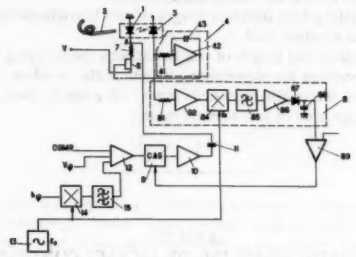
Didier Beaudet, St. Maur des Fosses, France, assignor to Societe Anonyme De Telecommunications, Paris

Filed May 3, 1983, Ser. No. 491,223

Claims priority, application France, May 6, 1982, 82 07845

Int. Cl.³ H04B 9/00

U.S. Cl. 455—611 **3 Claims**



1. Apparatus for regulating emissions from a laser diode comprising:

a luminous energy-emitting laser diode;

a control photodiode for collecting luminous energy emitted by said laser diode and providing a photodiode signal as a function of the collected energy;

feedback means responsive to said photodiode signal for controlling the energy emitted by said laser diode;

generator means for providing a pilot signal at a pilot frequency;

modulation means for modulating said pilot signal with a digital pulse train to provide a modulated pilot signal;

coupling means for combining said modulated pilot signal with a composite signal to provide a first signal as a function of the combined modulated pilot signal and the composite signal;

automatic gain control means responsive to application of a gain control signal thereto for automatically regulating the amplitude of said first signal;

means for modulating the luminous energy emitted by said laser diode as a function of said amplitude-regulated first signal;

demodulator means for demodulating said photodiode signal with said pilot signal to provide a demodulated signal; and

filtering and detection means for filtering and detecting said demodulated signal to provide said control signal applied to said automatic gain control means.

DESIGN PATENTS

GRANTED MAR. 12, 1985

ERRATA

For CLASS	See PATENT NO.
D19–034	277,912
D14–058	277,929

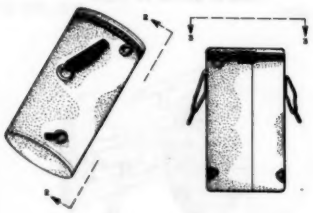
DESIGNS

MARCH 12, 1985

277,899
SKI BOOT ATTACHMENT
Thomas Hutchinson, 21732 Palos Verdes Blvd., Torrance, Calif. 90503
Filed Sep. 7, 1982, Ser. No. 415,565
Term of patent 14 years
U.S. Cl. D2—317

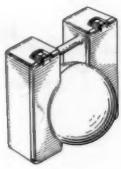
277,900
PORTABLE GOLFING ACCESSORY
Laverne H. Reed, 6702 El Progresso, Long Beach, Calif. 90815
Filed Oct. 1, 1982, Ser. No. 432,188
Term of patent 14 years
U.S. Cl. D2—400

277,901
BACKPACK CARRYING BAG FOR AN INSULATED CONTAINER
Peter C. Leslie, 1354 Castleton Rd., Richmond, Va. 23225
Filed Aug. 2, 1982, Ser. No. 404,219
Term of patent 14 years
U.S. Cl. D3—32



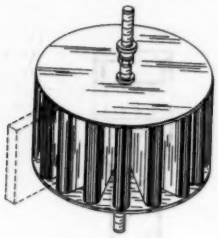
277,902
FLEXIBLE SKI-CARRIER
Jackie G. Williams, 1976 S. 1850 East, Ogden, Utah 84401
Filed Sep. 24, 1982, Ser. No. 422,713
Term of patent 14 years
U.S. Cl. D3—36

277,903
BOWLING BALL AND SHOE CARRIER
Edward M. Starzec, Canoga Park, Calif., assignor to Chas. "Robby" Robinson Enterprises, Inc., Glendale, Calif.
Filed Jan. 24, 1983, Ser. No. 460,306
Term of patent 14 years
U.S. Cl. D3—36

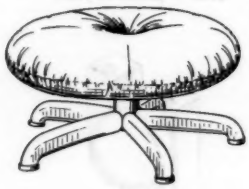


277,904
COLLAPSIBLE TOTE BAG WITH SLOTTED COVER
Harold Rabinowitz, Midlothian, Va., assignor to Nappe Babcock Co., Richmond, Va.
Filed Oct. 22, 1982, Ser. No. 436,072
Term of patent 14 years
U.S. Cl. D3—53

277,905
CASSETTE TAPE HOLDER
James W. Barber, 6401 Miragrande Dr., Las Vegas, Nev. 89108
Continuation-in-part of Ser. No. 118,645, Feb. 4, 1980, Pat. No. Des. 272,584. This application Mar. 26, 1982, Ser. No. 362,099
Term of patent 14 years
U.S. Cl. D6—407

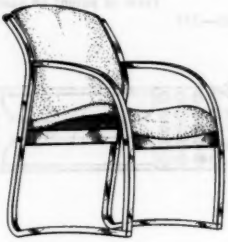


277,906
OTTOMAN
Warren Platner, Foote's Bridge Rd., Guilford, Conn. 06437
Filed Jan. 3, 1983, Ser. No. 455,059
Term of patent 14 years
U.S. Cl. D6—352

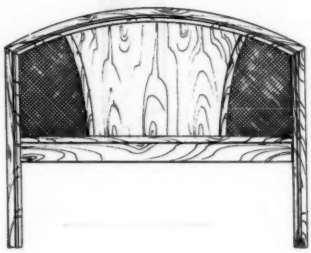


277,907
SLED BASED ARM CHAIR WITH CLOSED ARM
Robert A. Keeler, Grand Rapids, Mich., assignor to Steelcase Inc., Grand Rapids, Mich.
Continuation-in-part of Ser. No. 328,462, Dec. 7, 1981,. This application Jun. 1, 1982, Ser. No. 383,564
The portion of the term of this patent subsequent to Nov. 30, 2001, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—372

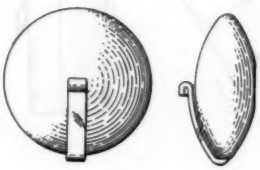
277,908
CHAIR
Henrik Liisberg, South San Francisco, Calif., assignor to Executive Office Concepts, Compton, Calif.
Filed Dec. 7, 1981, Ser. No. 327,833
Term of patent 14 years
U.S. Cl. D6—373



277,909
HEADBOARD
Haywood L. West, High Point, N.C., assignor to Burlington Furniture, Div. of Burlington Industries, Inc., Greensboro, N.C.
Filed Sep. 13, 1982, Ser. No. 417,104
Term of patent 14 years
U.S. Cl. D6—507

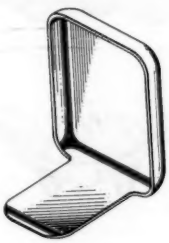


277,910
WALL-MOUNTED DISPENSER
Earl Hoyt, 210 Chickasaw Trail, Franklin Lakes, N.J. 07417
Filed Jul. 16, 1981, Ser. No. 283,753
Term of patent 14 years
U.S. Cl. D6—545



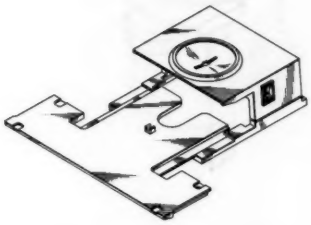
277,911
CUTTING ATTACHMENT FOR PAPER ROLL HOLDER OR SIMILAR ARTICLE
Bertil Lundén, Hovås, Sweden, assignor to Molnlycke AB, Gothenburg, Sweden
Filed Jun. 2, 1982, Ser. No. 384,388
Claims priority, application Sweden, Dec. 2, 1981, 81-2830
Term of patent 14 years
U.S. Cl. D6—523

277,912
BOOKEND
Mel Evenson, San Pedro, Calif., assignor to Eldon Industries, Inc., Inglewood, Calif.
Filed Apr. 12, 1982, Ser. No. 367,364
Term of patent 14 years
U.S. Cl. D19—34.1

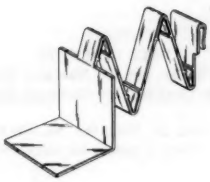


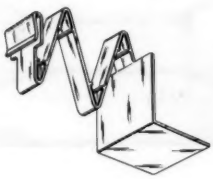
277,913
WALL-MOUNTED SUPPORT
Ron Reisman, 16 Yad Harutsim St., Jerusalem, Israel
Filed Jun. 30, 1982, Ser. No. 393,924
Term of patent 14 years
U.S. Cl. D6—570

277,914
STAND FOR DISPLAY AND KEYBOARD OR THE LIKE
Ralph A. Haus, Austin, Tex., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed Mar. 31, 1982, Ser. No. 363,987
Term of patent 14 years
U.S. Cl. D6—431



277,915
DISPENSING SHELF ATTACHMENT
Frank P. Field, 854 Napoli Dr., Pacific Palisades, Calif. 90272
Filed Sep. 28, 1982, Ser. No. 431,752
Term of patent 14 years
U.S. Cl. D6—574

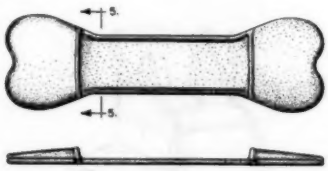




277,916
ARM REST
Robert Aronowitz, New York, and Bernard Katzanek, Brooklyn, both of N.Y., assignors to Simmons Universal Corporation, New York, N.Y.
Filed Jan. 31, 1983, Ser. No. 462,657
Term of patent 14 years
U.S. Cl. D6—501

277,917
INFLATABLE ORTHOPEDIC BACK SUPPORT
Bernard H. Slakman, 6580 Oakwood Dr., Douglasville, Ga. 30135
Filed Dec. 22, 1982, Ser. No. 452,062
Term of patent 14 years
U.S. Cl. D6—604

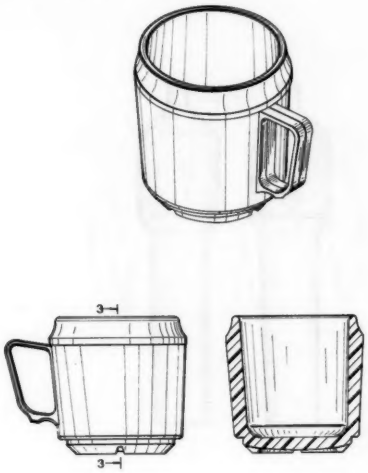
277,918
TOWEL FOR PETS
Peter M. Berns, Chicago, and Ely Simonoff, Evanston, both of Ill., assignors to Opelika Manufacturing Corporation, Chicago, Ill.
Filed Oct. 26, 1982, Ser. No. 436,680
Term of patent 14 years
U.S. Cl. D6—608



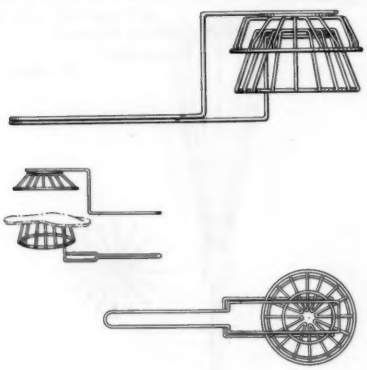
277,919
SNACK BOWL
Larry R. Laslo, New York, N.Y., assignor to American Commercial, Incorporated, Secaucus, N.J.
Filed Sep. 15, 1982, Ser. No. 418,471
Term of patent 14 years
U.S. Cl. D7—5

277,920
RELISH TRAY
Larry R. Laslo, New York, N.Y., assignor to American Commercial, Incorporated, Secaucus, N.Y.
Filed Dec. 22, 1982, Ser. No. 452,379
Term of patent 14 years
U.S. Cl. D7—5

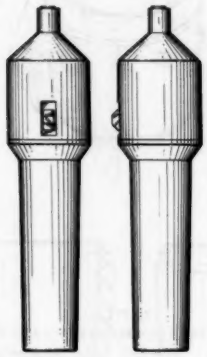
277,921
INSULATED CUP
Edgar Otto, 9 Kevin Rd., Scotch Plains, N.J. 07080
Filed Sep. 22, 1982, Ser. No. 421,356
Term of patent 14 years
U.S. Cl. D7—9



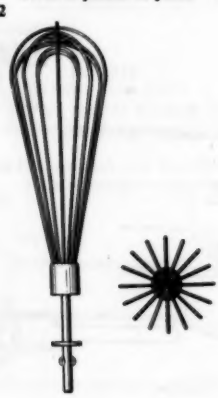
277,922
TORTILLA BASKET FRYER
Wade A. Bentson, San Francisco, Calif., assignor to AMCO Corporation, Chicago, Ill.
Filed Nov. 18, 1983, Ser. No. 553,371
Term of patent 14 years
U.S. Cl. D7—43



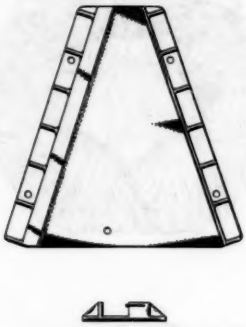
277,923
KITCHEN APPLIANCE HANDLE
Barbara Kafka, 23 E. 92nd St., New York, N.Y. 10028
Filed Sep. 7, 1982, Ser. No. 415,263
Term of patent 14 years
U.S. Cl. D7—379



277,924
KITCHEN APPLIANCE WHISK
Barbara Kafka, 23 E. 92nd St., New York, N.Y. 10028
Filed Sep. 7, 1982, Ser. No. 415,264
Term of patent 14 years
U.S. Cl. D7—412



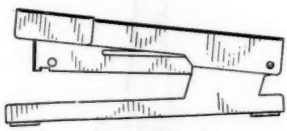
277,925
DEVICE FOR REMOVING A CAP FROM A JAR
Chester A. Blackburn, 15602 Bowman Hilton Rd. E., Space 135, Puyallup, Wash. 98371
Filed Jun. 1, 1982, Ser. No. 383,706
Term of patent 14 years
U.S. Cl. D8—37



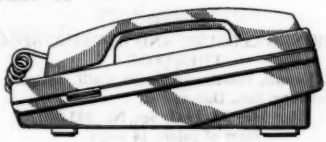
277,926
CAN OPENER
Ivan Chow, Flat D & E, 5th Flr., Tak Lee Commercial Bldg., 113-117 Wanchai Rd., Hong Kong, Hong Kong
Filed May 3, 1982, Ser. No. 373,912
Claims priority, application United Kingdom, Mar. 18, 1982, 1,005,688
Term of patent 14 years
U.S. Cl. D8—41

277,927
RIGHT ANGLE TROWEL
Wilfred J. Zieglmeier, Rte. 3, St. Cloud, Minn. 56301
Filed Sep. 13, 1982, Ser. No. 416,918
Term of patent 14 years
U.S. Cl. D8—45

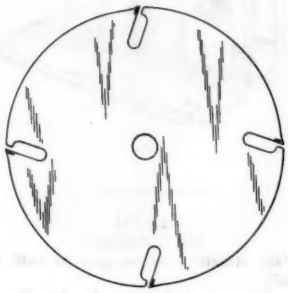
277,928
STAPLER
Toshikazu Suzuki, 2-32-2 Gohongi, Meguro-ku, Tokyo, Japan
Filed Aug. 26, 1982, Ser. No. 411,859
Term of patent 14 years
U.S. Cl. D8—50



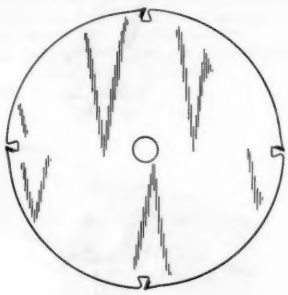
277,929
TELEPHONE
Motoaki Sakamoto, Tanashi; Ichiro Sato, and Sadao Takatsuka, both of Maebashi, all of Japan, assignors to Nakayo Telecommunications Inc., Tokyo, Japan
Filed Oct. 14, 1982, Ser. No. 434,418
Claims priority, application Japan, May 4, 1982, 57-18904
Term of patent 14 years
U.S. Cl. D14—58



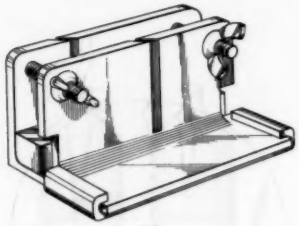
277,930
CIRCULAR SAW BLADE OR THE LIKE
Frederic G. Croydon, Portland, Oreg., assignor to Omark Industries, Inc., Portland, Oreg.
Filed Jul. 26, 1982, Ser. No. 401,928
Term of patent 14 years
U.S. Cl. D8—70



277,931
CIRCULAR SAW BLADE
Frederic G. Croydon, Portland, Oreg., assignor to Omark Industries, Inc., Portland, Oreg.
Filed Jul. 26, 1982, Ser. No. 402,135
Term of patent 14 years
U.S. Cl. D8—70



277,932
ANGLE-CUT HOLDER
Michael Baptiste, 1795 Cranston St., Cranston, R.I. 02920
Filed Aug. 2, 1982, Ser. No. 404,434
Term of patent 14 years
U.S. Cl. D8—71



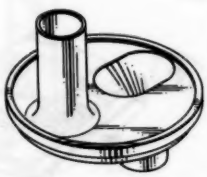
277,933
ESCUTCHEON
Pasquale Valli, Renate, Italy, assignor to Valli & Columbo S.p.A., Italy
Filed Jun. 7, 1982, Ser. No. 385,452
Claims priority, application Italy, Dec. 16, 1981, 23791/81[U]
Term of patent 14 years
U.S. Cl. D8—350

277,934
SNAP FASTENER FOR FOLDABLE DISPLAY PANELS
Anders Beckrot, Ingarö, Sweden, assignor to Ahlberg Beckrot Ytter AB, Stockholm, Sweden
Filed Apr. 23, 1982, Ser. No. 371,467
Claims priority, application Sweden, Oct. 26, 1981, 81-2439; Oct. 26, 1981, 81-2440
Term of patent 14 years
U.S. Cl. D8—395

277,935
WEDGING FASTENER FOR FOLDABLE DISPLAY PANELS
Anders Beckrot, Ingarö , Sweden, assignor to Ahlberg Beckrot Ytter AB, Stockholm, Sweden
Filed Apr. 23, 1982, Ser. No. 371,468
Claims priority, application Sweden, Oct. 26, 1981, 81-2441
Term of patent 14 years
U.S. Cl. D8—382

277,936
BOTTLE
Charles S. Tobias, Road Town, British Virgin Isls., assignor to Pusser's Inc., Tortola, British Virgin Isls.
Filed Dec. 30, 1982, Ser. No. 454,516
Term of patent 14 years
U.S. Cl. D9—307

277,937
COMBINED CLOSURE AND POURING SPOUT THEREFOR
Vincent E. Fortuna, Huntington Beach, Calif., assignor to Cosden Technology, Inc., Dallas, Tex.
Filed May 12, 1983, Ser. No. 493,840
Term of patent 14 years
U.S. Cl. D9—447

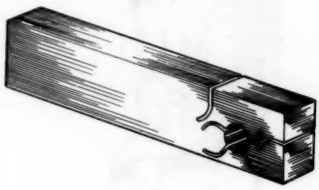


277,938
COMBINED CLINICAL TEMPERATURE PROBE AND ELECTRODE
Wallace L. Knute, Del Mar, Calif., assignor to Camino Laboratories, San Diego, Calif.
Filed Sep. 7, 1982, Ser. No. 415,550
Term of patent 14 years
U.S. Cl. D10—60

277,939
CHILD'S GROWTH MEASURING AND REGISTERING UNIT
Lowell C. Bergstedt, and Marie C. Bergstedt, both of 47 Dartmouth St., San Francisco, Calif. 94134
Filed Aug. 25, 1982, Ser. No. 411,487
Term of patent 14 years
U.S. Cl. D10—71

277,940
CHILD'S GROWTH MEASURING AND REGISTERING UNIT
Lowell C. Bergstedt, and Marie C. Bergstedt, both of 47 Dartmouth St., San Francisco, Calif. 94134
Filed Aug. 25, 1982, Ser. No. 411,489
Term of patent 14 years
U.S. Cl. D10—71

277,941
MEASURE BEAM FOR MEASURING FORCE AND/OR MOVEMENT
Tomas Dalgren, Spånga, and Stefan Bungerfeldt, Rönninge, both of Sweden, assignors to NAF Aktiebolag, Linkoping, Sweden
Filed Dec. 8, 1982, Ser. No. 448,015
Claims priority, application Sweden, Jun. 16, 1982, 82-1576
Term of patent 14 years
U.S. Cl. D10—83

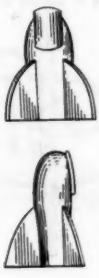


277,942
DIAMOND
Franciscus Valckx, Ketsstraat, 15, 2000 Antwerp, Belgium
Filed Aug. 31, 1982, Ser. No. 413,599
Claims priority, application Benelux, Mar. 1, 1982, 02720-01
Term of patent 14 years
U.S. Cl. D11—90

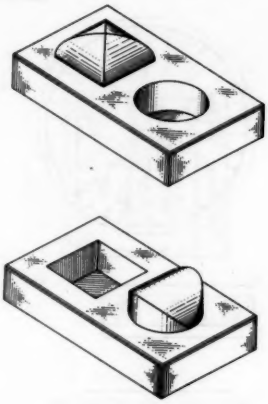
277,944
CHRISTMAS ORNAMENT
Julia Andrus, Salt Lake City, Utah, assignor to Authentica, Inc., Salt Lake City, Utah
Filed Nov. 10, 1982, Ser. No. 440,582
Term of patent 14 years
U.S. Cl. D11—121

277,943
NOVELTY BADGE
Gregory Jones, 1940 Webb, Detroit, Mich. 48206
Filed Aug. 23, 1982, Ser. No. 410,523
Term of patent 14 years
U.S. Cl. D11—104

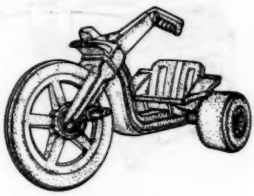
277,945
HOLIDAY ORNAMENT
Mary J. Garnier, 6150 N. Kenmore, Chicago, Ill. 60660
Filed Sep. 16, 1981, Ser. No. 302,738
Term of patent 14 years
U.S. Cl. D11—125



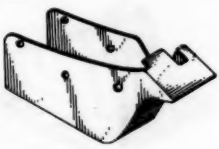
277,946
DESK SET OR SIMILAR ARTICLE HAVING A BI-CYLINDRIC FIGURINE AND FIGURINE HOLDER
Thomas M. Farrell, 678 Hermose Ave., Cincinnati, Ohio 45238
Filed Aug. 2, 1982, Ser. No. 404,577
Term of patent 14 years
U.S. Cl. D11—131



277,947
TRICYCLE
Martin Blumenthal, 99 Longview Ave., Chatham, N.J. 07928
Filed Dec. 21, 1981, Ser. No. 332,494
Term of patent 14 years
U.S. Cl. D12—112



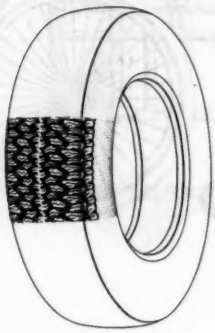
277,948
MOTORBIKE BRAKE ASSEMBLY HOUSING
Kenneth D. Hurley, Saginaw, Mich., assignor to Mark E. Burch, Bay City, Mich., a part interest
Filed Sep. 2, 1982, Ser. No. 414,489
Term of patent 14 years
U.S. Cl. D12—126



277,949
FOLDABLE WHEELCHAIR
Jeffrey P. Minnebraker, Westlake Village, Calif., assignor to Quadra Wheelchairs, Inc., Westlake Village, Calif.
Filed May 14, 1982, Ser. No. 378,847
Term of patent 14 years
U.S. Cl. D12—131

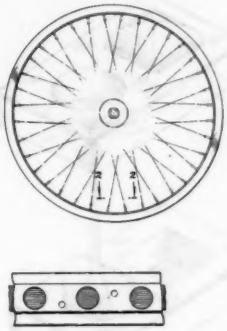
277,950
VEHICLE TIRE
Hideaki Nagayasu, Kakogawa, Japan, assignor to Sumitomo Rubber Industries Ltd., Kobe, Japan
Filed Jul. 13, 1982, Ser. No. 397,866
Claims priority, application Japan, Jan. 13, 1982, 57-1013
Term of patent 14 years
U.S. Cl. D12—147

277,951
TIRE
Joseph F. Molnar, Wadsworth, and Bill J. Wallet, Marshallville, both of Ohio, assignors to The Firestone Tire & Rubber Co., Akron, Ohio
Filed Mar. 11, 1983, Ser. No. 474,219
Term of patent 14 years
U.S. Cl. D12—147



277,952
SHOCK ABSORBER FOR MOTORCYCLE
Hiroshi Nakano, Tokyo, and Yasuaki Ohshima, Asaka, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Mar. 12, 1982, Ser. No. 357,680
Claims priority, application Japan, Sep. 19, 1981, 56-41631
Term of patent 14 years
U.S. Cl. D12—159

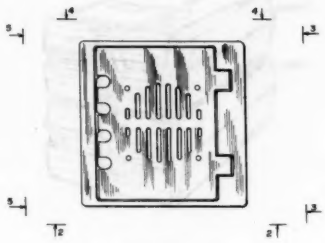
277,953
WHEEL RIM
Stanley C. Hess, Chatsworth, Calif., assignor to B.M.X. Products, Inc., Moorpark, Calif.
Filed Oct. 29, 1982, Ser. No. 437,533
Term of patent 14 years
U.S. Cl. D12—208

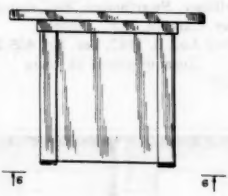


277,954
ENGINE GENERATOR
Sadao Mizushima, Tokyo, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Sep. 16, 1982, Ser. No. 418,825
Claims priority, application Japan, Apr. 13, 1982, 57-15767
Term of patent 14 years
U.S. Cl. D13—1

277,955
LIGHT-EMITTING DIODE SEMICONDUCTOR CHIP WITH LEADS
Kaoru Takahashi, Zama, Japan, assignor to Stanley Electric Co., Ltd., Tokyo, Japan
Filed Apr. 28, 1982, Ser. No. 372,644
Claims priority, application Japan, Oct. 30, 1981, 56-48468
Term of patent 14 years
U.S. Cl. D13—12

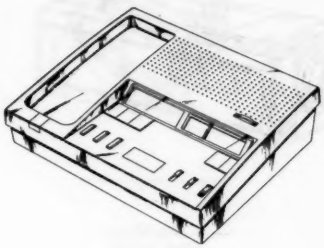
277,956
SPEAKER ENCLOSURE FOR RAISED FLOOR INSTALLATION
William D. Quigley, 132 Oakridge Ave., Nutley, N.J. 07110, and Philip H. Nelson, 42 Harmony Rd., Spring Valley, N.Y. 10977
Filed Nov. 19, 1982, Ser. No. 443,141
Term of patent 14 years
U.S. Cl. D14—33





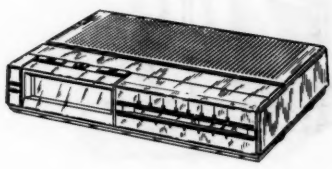
277,957
TELEPHONE DISPLAY SET BASE
Clifford D. Read, Almonte, Canada, assignor to Northern Telecom Limited, Montreal, Canada
Filed Jun. 10, 1982, Ser. No. 387,228
Term of patent 14 years
U.S. Cl. D14—54

277,958
TELEPHONE INSTRUMENT BASE FOR A HANDSET
Kenneth R. Cooke, New York, and Vito L. Porcelli, Ossining, both of N.Y., assignors to AT&T Technologies, Inc., New York, N.Y.
Filed Jan. 16, 1984, Ser. No. 570,942
Term of patent 14 years
U.S. Cl. D14—60

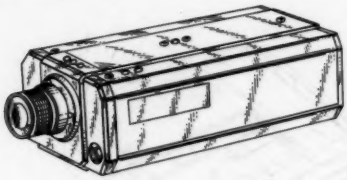


277,959
PORTABLE RADIO RECEIVER
Hans T. Meelen, Geldrop, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Sep. 23, 1982, Ser. No. 422,226
Claims priority, application United Kingdom, Apr. 8, 1982, 1006073
Term of patent 14 years
U.S. Cl. D14—70

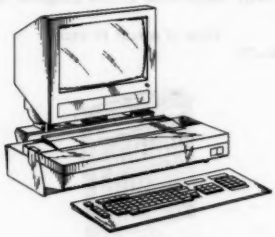
277,960
CLOCK RADIO RECEIVER
Sies K. Brandsma, Eersel, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Sep. 23, 1982, Ser. No. 422,225
Claims priority, application United Kingdom, Apr. 8, 1982, 1006.069
Term of patent 14 years
U.S. Cl. D14—73



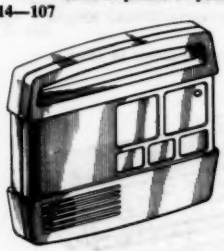
277,961
TELEVISION CAMERA
Norio Shimizu, Inagi, and Hiroshi Osaka, Kunitachi, both of Japan, assignors to Koyo Electronics Industries Co., Ltd., Tokyo, Japan
Filed Nov. 24, 1982, Ser. No. 444,461
Term of patent 14 years
U.S. Cl. D14—78



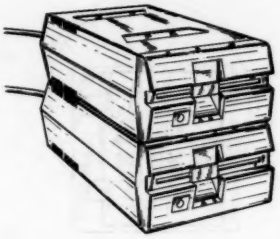
277,962
WORD PROCESSOR
Richard S. Thom, London, England, assignor to Prutec Limited, London, England
Filed Aug. 3, 1982, Ser. No. 404,926
Claims priority, application United Kingdom, Feb. 10, 1982, 1005034
Term of patent 14 years
U.S. Cl. D14—106



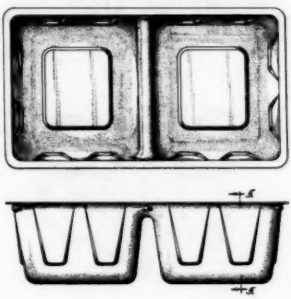
277,963
HOUSING FOR VOICE SYNTHESIZER AND VOICE ACTIVATING BAR CODE READER
William J. Bousman, Burlington, Wis., assignor to Western Publishing Co., Racine, Wis.
Filed Sep. 13, 1982, Ser. No. 417,809
Term of patent 14 years
U.S. Cl. D14—107



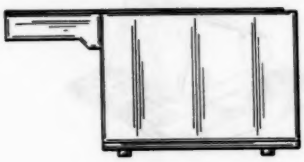
277,964
DISK DRIVE UNIT FOR A COMPUTER SYSTEM
Eric G. Xanthopoulus, San Jose, Calif., assignor to Cromemco Inc., Calif.
Filed Nov. 2, 1982, Ser. No. 438,699
Term of patent 14 years
U.S. Cl. D14—109



277,965
FREEZER TRAY
Frank H. Terwilliger, Swarthmore, Pa., assignor to Campbell Soup Company, Camden, N.J.
Filed Aug. 3, 1982, Ser. No. 405,237
Term of patent 14 years
U.S. Cl. D15—90

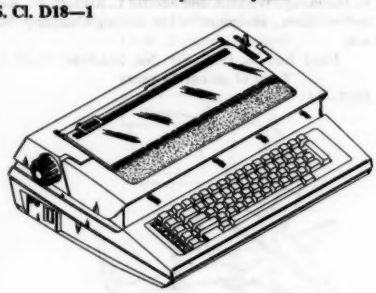


277,966
COPIER PAPER FEEDER
Mikio Kosako, Osaka, Japan, assignor to Sharp Kabushiki Kaisha (Sharp Corporation), Osaka, Japan
Filed Oct. 15, 1982, Ser. No. 434,595
Claims priority, application Japan, Apr. 19, 1982, 57-17079
Term of patent 14 years
U.S. Cl. D16—32

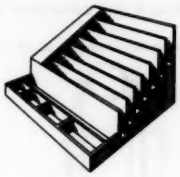


277,967
CLARINET LIGATURE
G. James Gholson, Jr., 1311 Parkland Dr., Memphis, Tenn. 38111
Filed Sep. 23, 1982, Ser. No. 422,445
Term of patent 14 years
U.S. Cl. D17—13

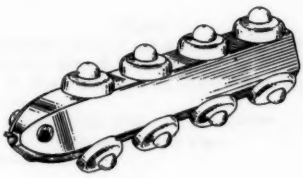
277,968
TYPEWRITER
John E. Jolliffe, Manlius, N.Y., assignor to SCM Corporation, New York, N.Y.
Filed Apr. 15, 1983, Ser. No. 485,545
Term of patent 14 years
U.S. Cl. D18—1



277,969
DESK ORGANIZER WITH UTILITY COMPARTMENTS
Jose N. S. Bustos, 5312 SW. 149 Pl., Miami, Fla. 33185
Filed Sep. 29, 1982, Ser. No. 426,721
Term of patent 14 years
U.S. Cl. D19—75

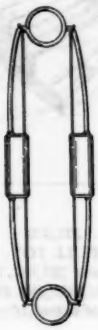


277,970
PULL TOY
Floyd L. York, 33575 Bonnie "B" Rd., North Fork, Calif. 93643
Filed Jul. 19, 1982, Ser. No. 399,838
Term of patent 14 years
U.S. Cl. D21—59

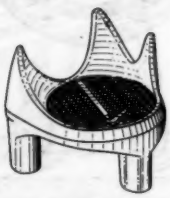


277,971
WATER TOY
Anthony DeGregorio, Brooklyn, N.Y., assignor to Preferred Services, Ltd., New York, N.Y.
Filed Jul. 21, 1982, Ser. No. 407,091
Term of patent 14 years
U.S. Cl. D21—59

277,972
PHYSICAL EXERCISER; A PULL AND RELEASE TYPE
Joseph Manzi, Bronx, N.Y., assignor to Gossling Development Corporation, New York, N.Y.
Filed Sep. 10, 1982, Ser. No. 417,193
Term of patent 14 years
U.S. Cl. D21—198

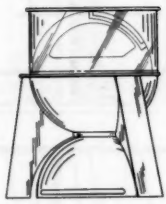


277,973
FOOTBALL KICKING TEE
Jan Stenerud, Overland Park, Kans., assignor to Jan Stenerud and Company, Inc., Shawnee Mission, Kans.
Filed Apr. 23, 1982, Ser. No. 370,783
Term of patent 14 years
U.S. Cl. D21—209

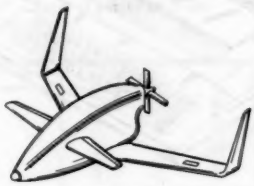


277,974
LIFE-SAVING JACKET
Ake Larsjos, Gävle, Sweden, assignor to Frosta Fritid Aktiebolaget, Sweden
Filed Feb. 23, 1982, Ser. No. 351,460
Claims priority, application Sweden, Aug. 25, 1981, 81-1818
Term of patent 14 years
U.S. Cl. D21—238

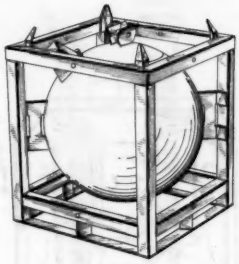
277,975
AMUSEMENT RIDE
John J. Sassak, 36855 Schoolcraft, Livonia, Mich. 48150
Filed Jun. 13, 1983, Ser. No. 503,720
Term of patent 14 years
U.S. Cl. D21—242



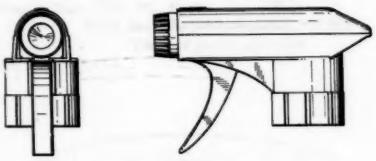
277,976
AUTONOMOUS DRONE MISSILE
Richard B. Holloway, Wichita, and Merlin L. Millett, Jr., Sedgwick, both of Kans., assignors to The Boeing Company, Seattle, Wash.
Filed Jan. 28, 1982, Ser. No. 343,566
Term of patent 14 years
U.S. Cl. D22—11



277,977
SPHERICAL GAS CONTAINER
Svante Lang, Kallback, Finland, assignor to AGA Aktiebolag, Lidingo, Sweden
Filed Jul. 23, 1982, Ser. No. 401,160
Claims priority, application Norway, Jan. 26, 1982, 62605
Term of patent 14 years
U.S. Cl. D23—2

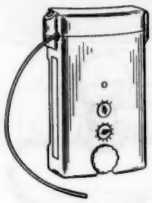


277,978
TRIGGER SPRAYER
Robert L. Bundschuh, Box 4415, Miami Lakes, Fla. 33014
Filed Sep. 13, 1982, Ser. No. 417,362
Term of patent 14 years
U.S. Cl. D23—17



277,979
AMINO ACID ANALYZER
Hugh O. Brown, Campbell, and James R. Lindsay, Yorba Linda, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.
Filed Oct. 12, 1982, Ser. No. 433,746
Term of patent 14 years
U.S. Cl. D24—1.1

277,980
MEDICATION DOSAGING DEVICE OR SIMILAR ARTICLE
Olaf Bransky, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany
Filed Feb. 17, 1981, Ser. No. 235,001
Claims priority, application Fed. Rep. of Germany, Aug. 11, 1980, 12-227
Term of patent 14 years
U.S. Cl. D24—8

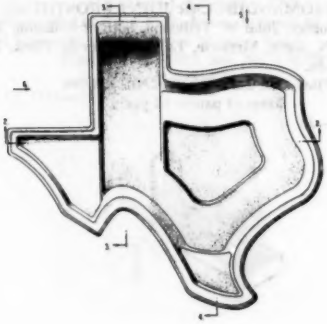


277,981
TEMPOROMANDIBULAR JOINT PROSTHESIS
Charles A. Homsy; John W. Tellkamp, both of Houston, Tex., and John N. Kent, Metairie, La., assignors to Vitek, Inc., Houston, Tex.
Filed Oct. 22, 1982, Ser. No. 435,995
Term of patent 14 years
U.S. Cl. D24—33

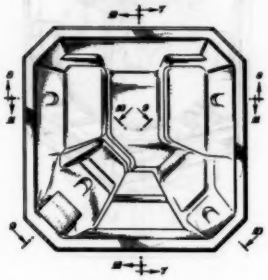
277,982
TEMPOROMANDIBULAR JOINT PROSTHESIS
Charles A. Homsy; John W. Tellkamp, both of Houston, Tex., and John N. Kent, Metairie, La., assignors to Vitek, Inc., Houston, Tex.
Filed Oct. 22, 1982, Ser. No. 435,996
Term of patent 14 years
U.S. Cl. D24—33

277,983
APPARATUS FOR COSMETIC TREATMENT OF THE HUMAN SKIN
Marion Kaminski, Hohe Raine 11, 8871 Haldenwang, Fed. Rep. of Germany
Filed Jul. 29, 1982, Ser. No. 403,283
Claims priority, application Fed. Rep. of Germany, Feb. 10, 1982, MR II, Nr. 1023
Term of patent 14 years
U.S. Cl. D24—36

277,984
HOT TUB
Pablo V. Delgado, and Diane K. Maresca, both of El Paso, Tex., assignors to Neal Maresca, El Paso, Tex.
Filed Aug. 5, 1982, Ser. No. 405,499
Term of patent 14 years
U.S. Cl. D24—38



277,985
WHIRLPOOL BATHING SHELL
Robert C. Kingsley, Northridge, Calif., assignor to Hydro-Spa, Inc., Piru, Calif.
Filed Oct. 21, 1983, Ser. No. 544,444
Term of patent 14 years
U.S. Cl. D24—38



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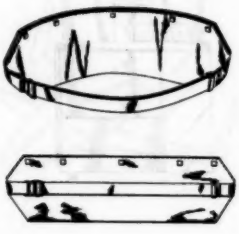
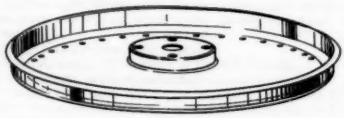
FABRIC DIALYSIS-EQUIPMENT CARRIER FOR AMBULATORY PATIENTS
William E. Webb, 20 Harrison St., Reading, Mass. 01867
Filed Mar. 22, 1982, Ser. No. 360,332
Term of patent 14 years
U.S. Cl. D24—64



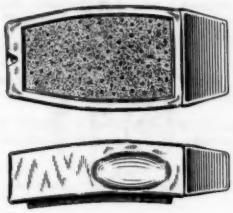
277,987
RAZOR HANDLE
Chester F. Jacobson, Southboro; Michael J. Gray, Duxbury, and Robert A. Trotta, Pembroke, all of Mass., assignors to The Gillette Company, Boston, Mass.
Filed Jun. 14, 1982, Ser. No. 387,801
Term of patent 14 years
U.S. Cl. D28—48

277,988
TRAY FOR BIRD FEEDER
Peter Kilham, Mill Rd., Foster, R.I. 02825
Filed Jan. 25, 1983, Ser. No. 460,992
Term of patent 14 years
U.S. Cl. D30—14

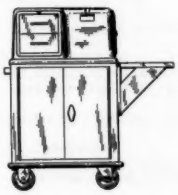


277,989
SADDLE RACK
George H. Wakat, 9120 Grey Cloud Trail South, St. Paul Park, Minn. 55071
Filed May 21, 1982, Ser. No. 380,915
Term of patent 14 years
U.S. Cl. D30—45

277,990
COMBINED DISPENSER AND APPLICATOR
Albert E. Markarian, 430 Highwood Ave., Leonia, N.J. 07605
Filed Apr. 5, 1982, Ser. No. 365,873
Term of patent 14 years
U.S. Cl. D32—45



277,991
CART FOR HANDLING BIOLOGICAL TISSUE
James H. Becker, Topeka, Kans., assignor to Marketing International, Inc., Topeka, Kans.
Continuation-in-part of Ser. No. 435,244, Oct. 19, 1982,. This application May 12, 1983, Ser. No. 493,927
Term of patent 14 years
U.S. Cl. D34—20



277,992

LOAD TRANSFER DEVICE

Alan W. Tupper, The Weavers House, Castle Combe, Wiltshire, SN14 7HX, England

Filed May 20, 1982, Ser. No. 380,286

Claims priority, application United Kingdom, Dec. 23, 1981, 1004352

Term of patent 14 years

U.S. Cl. D34—28

277,993

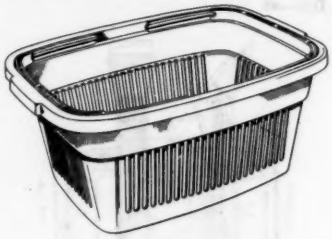
STACKABLE UTILITY BASKET

John D. Sinchok, Wooster, Ohio, assignor to Rubbermaid Incorporated, Wooster, Ohio

Filed Jun. 25, 1982, Ser. No. 392,273

Term of patent 14 years

U.S. Cl. D34—44



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TO WHOM

PATENTS WERE ISSUED ON THE 12TH DAY OF MARCH, 1985

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. Nattermann & Cie GmbH: *See*—
Lautenschlager, Hans-Heiner; Hilboll, Gerd; Friehe, Hugo; and Lohr, Josef P., 4,504,479, Cl. 514-252.000.

A/S Neselco: *See*—
Sorensen, Gunnar; and Svendsen, Leo G., 4,504,529, Cl. 427-437.000.

Aalto Scientific, Ltd.: *See*—
Reynolds, Robert A., 4,504,585, Cl. 436-518.000.

AB Ernol: *See*—
Nilsson, Maths, 4,503,781, Cl. 108-64.000.

Abbott Laboratories: *See*—
Sun, Ming, 4,504,579, Cl. 435-28.000.

Abdelhamid, Amr N.: *See*—
Traver, Darwin G.; Anderson, Carl M.; and Abdelhamid, Amr N., 4,504,188, Cl. 415-1.000.

Abel, Edward P.; and Bowman, Wayne A., to Eastman Kodak Company. Photographic material with a temporary barrier layer comprising a chill-gelable polymer. 4,504,569, Cl. 430-214.000.

Abele, Ludwig: *See*—
Scherl, Wolfgang; Abele, Ludwig; Wahl, Friedrich M.; and Fuchsberger, Hermann, 4,504,972, Cl. 382-51.000.

Abolins, Visvaldis; and Holub, Fred F., to General Electric Company. Polyphenylene ether resin compositions having improved ductile impact strength. 4,504,613, Cl. 524-125.000.

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Jantzen, Steven L., 4,504,047, Cl. 269-43.000.

Acharya, Kishore C.; Gilbert, Thomas J.; and Griffie, Terry R., to General Electric Company. Method of using an array processor for real time processing. 4,504,909, Cl. 364-414.000.

Achtstaetter, Gerhard, to ITT Industries, Inc. Digital circuit for generating a binary signal on the occurrence of a given frequency ratio of two signals. 4,504,862, Cl. 358-158.000.

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Adachi, Akira; Kubota, Takashi; Okada, Yukio; Miyazaki, Kenichi; and Hagiwara, Taro, to Japan Styrene Paper Corporation; and Nissan Motor Company, Limited. Core material for automobile bumpers. 4,504,534, Cl. 428-71.000.

Adams Elevator Equipment Company: *See*—
Hennessey, Thomas M., 4,504,713, Cl. 200-241.000.

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April, Georges E., 4,504,973, Cl. 455-192.000.

Aesculap-Werke Aktiengesellschaft: *See*—
Caspar, Wolfhard; and Lutze, Theodor, 4,503,848, Cl. 128-92.00D.

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Atlani, Martial; Loutaty, Roben; Wakselman, Claude; and Yacono, Charles, 4,504,287, Cl. 55-53.000.

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Engelking, Uwe, 4,504,033, Cl. 244-170.000.

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Kunikyo, Tomoo, 4,504,945, Cl. 370-88.000.

Agfa-Gevaert Aktiengesellschaft: *See*—
Kampfer, Helmut; Hase, Marie; and Glass, Max, 4,504,668, Cl. 548-120.000.

Agracetus: *See*—
Brill, Winston J.; and von Meyer, William C., 4,504,468, Cl. 424-147.000.

Air-O-Scoop Corporation: *See*—
Chatlos, Richard, 4,503,756, Cl. 98-2.120.

Air Products and Chemicals, Inc.: *See*—
Davis, Ruth A.; Herron, Donn M.; Pervier, James W.; and Vines, Harvey L., 4,504,295, Cl. 62-30.000.
Newton, Charles L.; and Stuber, Wayne G., 4,504,296, Cl. 62-31.000.

Airaksinen, Pentti: *See*—
Hietanen, Esko; and Airaksinen, Pentti, 4,503,721, Cl. 74-44.000.

Aires, Ramon H.: *See*—
Easter, Finis C.; and Aires, Ramon H., 4,504,896, Cl. 363-21.000.

Aisin Seiki Kabushiki Kaisha: *See*—
Amano, Hiroyuki; and Sakakibara, Naoji, 4,504,756, Cl. 310-168.000.

Aisin Seiki Kabushiki of 1: *See*—
Akagi, Motonobu, 4,504,039, Cl. 251-65.000.

Aisin Warner Kabushiki Kaisha: *See*—
Hayakawa, Yoichi; and Ito, Yasunobu, 4,503,927, Cl. 180-247.000.

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Kurahashi, Osamu; Tsuchida, Takayasu; Kawashima, Hiroki; Enei, Hitoshi; and Nakamori, Shigeru, 4,504,581, Cl. 435-107.000.

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Kurumaji, Masanobu; Takeuchi, Naoki; Kondo, Hiroaki; Akita, Toshiaki; Sano, Tsutomu; and Sugano, Katsumi, 4,504,208, Cl. 425-589.000.

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Kenbo, Yukio; Akiyama, Nobuyuki; Koizumi, Mitsuyoshi; and Kuni, Asahiro, 4,504,045, Cl. 269-21.000.

Akutsu, Kazushi: *See*—
Miura, Kunio; Hasebe, Koshi; Ono, Takashi; Akutsu, Kazushi; Ohyama, Shinji; and Minami, Kazuaki, 4,504,913, Cl. 364-449.000.

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Hofer, Peter H.; and Albach, Eberhard R., 4,504,526, Cl. 427-248.100.

Alco Foodservice Equipment Company: *See*—
Carville, James G., 4,503,758, Cl. 99-329.0RT.

Aleksich, Bronco: *See*—
Baessler, Lee R., 4,503,862, Cl. 128-736.000.

Alfa-Laval AB: *See*—
Andersson, Kjell, 4,503,970, Cl. 198-781.000.

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Forsberg, Bjorn, 4,504,262, Cl. 494-53.000.

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Allazzetta, Felice; and Prola, Luigi, to Jaeger, Morris. Rope chain machine. 4,503,664, Cl. 59-16.000.

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Allemann, Kurt; Deneke, Klaus; Hass, Hansjurgen; and Vogel, Gunter, to Dynamit Nobel AG. Liquid accelerator for the setting of concrete mixtures. 4,504,315, Cl. 106-89.000.

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Callan, John E., 4,504,927, Cl. 364-900.000.

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Polen, Karl L.; and Scott, Edward S., 4,503,921, Cl. 177-147.000.

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Anderson, Bruce W., 4,503,950, Cl. 188-196.00R.
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Crumb, Donald A.; and Zander, Richard A., 4,503,677, Cl. 60-562.000.
Harwath, Frank A., 4,504,815, Cl. 337-201.000.
Heidmann, Kurt R.; and Marsh, Andrew, 4,503,947, Cl. 188-72.800.
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Mani, Krishnamurthy N.; and Chlanda, Frederick P., 4,504,373, Cl. 204-180.00P.
Resch, Alois R., 4,503,610, Cl. 29-845.000.
Sachleben, Harold G., Sr., 4,504,085, Cl. 285-119.000.
Williams, Benjamin J., Jr.; and Hodge, Robert G., 4,504,281, Cl. 48-195.000.

Allis-Chalmers Corporation: *See*—
Ballendux, Gerardus M., 4,503,727, Cl. 74-477.000.
Kuhn, Lowell L.; and Miggels, Stephen G., 4,503,749, Cl. 98-2.110.
Wood, Terry G., 4,503,680, Cl. 60-605.000.

Allred, David D.: *See*—
Ovshinsky, Stanford R.; Allred, David D.; Walter, Lee; and Hudgens, Stephen J., 4,504,518, Cl. 427-38.000.

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Igarashi, Sadao, 4,504,796, Cl. 330-286.000.
Kaneko, Akio; Kajiwara, Hitoshi; Haikawa, Yukihiko; and Nishiga, Kazuya, 4,504,968, Cl. 381-103.000.
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Okuya, Tsutae; and Ito, Yoshiyuki, 4,504,818, Cl. 338-119.000.
Tamai, Hideo; and Fujisawa, Kyuichi, 4,504,838, Cl. 346-46.000.
Tsuchiya, Tatsuhiko, 4,504,877, Cl. 360-96.200.
Watanabe, Yuji; and Yamashita, Takeshi, 4,504,706, Cl. 200-11.00R.

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Kurth, Charles W.; and Moerchen, John M., 4,504,497, Cl. 426-130.000.

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Carpenter, Kent H.; and Laferty, John M., 4,504,461, Cl. 423-593.000.
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Floyd, Middleton B., Jr.; Weiss, Martin J.; Grudzinskas, Charles V.; and Chen, Sow-Mei L., 4,504,417, Cl. 260-438.100.

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Barkus, Lee A.; and Bright, Edward J., 4,504,105, Cl. 339-75.0MP.
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Petersen, David A., 4,504,872, Cl. 360-40.000.

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Kuyper, Geoffrey S., 4,504,441, Cl. 419-35.000.

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Anastassiou, Dimitris; and Pennebaker, William B., to International Business Machines Corporation. Nonlinear filtering of gray scale images. 4,504,864, Cl. 358-167.000.

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Nixdorff, Frank S.; and Dornbusch, Arthur H., 4,503,986, Cl. 215-252.000.

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Traver, Darwin G.; Anderson, Carl M.; and Abdelhamid, Amr N., 4,504,188, Cl. 415-1.000.

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Brown, Milton F., Jr.; and Anderson, Darl, 4,504,082, Cl. 280-735.000.

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Ekelman, Ernest P., Jr.; and Ostertag, Edward L., 4,504,805, Cl. 333-126.000.

Andrews, Dana G., to Boeing Company, The. Aerodynamic braking and recovery method for a space vehicle. 4,504,031, Cl. 244-113.000.

Andrews, Norwood H., to Norandy, Incorporated. Apparatus for comminuting materials to extremely fine size using a circulating stream jet mill and a discrete but interconnected and interdependent rotating anvil-jet impact mill. 4,504,017, Cl. 241-40.000.

Anritsu Electric Company Limited: *See*—
Itaya, Hiroshi; and Nakatsugawa, Kenji, 4,504,906, Cl. 364-200.000.

Antonson, David L., to Minnesota Mining and Manufacturing Company. Decorative tape dispensing and applying apparatus. 4,504,351, Cl. 156-391.000.

Aoki, Hatsuo: *See*—
Kitaura, Yoshihiko; Nakaguchi, Osamu; Hemmi, Keiji; Aratani, Matsuhiko; Takeno, Hidekazu; Okada, Satoshi; Tanaka, Hirokazu; Hashimoto, Masashi; Kuroda, Yoshio; Iguchi, Eiko; Kohsaka, Masanobu; Aoki, Hatsuo; and Imanaka, Hiroshi, 4,504,584, Cl. 435-253.000.
Aoki, Takao; Kadowaki, Hidejiro; and Iwami, Naoki, to Canon Kabushiki Kaisha. Apparatus for color electrophotography. 4,504,137, Cl. 355-4.000.

Aoki, Toshiyuki: *See*—
Urakawa, Hidetaka; and Aoki, Toshiyuki, 4,503,772, Cl. 101-409.000.

Aoki, Yoshiaki: *See*—
Inui, Emiko; Iwano, Takao; Hara, Seishi; Mikami, Yukio; Kurita, Hideo; and Aoki, Yoshiaki, 4,504,433, Cl. 264-232.000.

Aonuma, Shigeo: *See*—
Tanaka, Koichi; Takayama, Hiroshi; Amagai, Yoshimi; Aonuma, Shigeo; and Fukase, Yasuji, 4,504,563, Cl. 430-109.000.

Aoyama, Keizo; and Yamauchi, Takahiko, to Fujitsu Limited. Semiconductor resistor element. 4,504,743, Cl. 307-310.000.

Apissomian, Arthur A., to Homecrest Industries Incorporated. Table with resilient edge. 4,503,780, Cl. 108-27.000.

Applegate, Barry G.; and Starkey, Stanley V., to Molins Limited. Apparatus for handling rod-like articles. 4,503,965, Cl. 198-347.000.

April, Georges E., to AED Satellite Systems, Ltd. Automatic disabling of AFC/AFT controller during receiver circuit tuning. 4,504,973, Cl. 455-192.000.

Arai, Akira: *See*—
Tanaka, Tatsumi; Hikita, Kiyoshi; Furuhashi, Masaru; Hatada, Toshio; Nakano, Katsuzi; and Arai, Akira, 4,503,907, Cl. 165-133.000.

Arai, Nobushige, to Sharp Kabushiki Kaisha. Self-cleaning coating compositions and cooking apparatus coated therewith. 4,504,717, Cl. 219-10.55E.

Arai, Tetsuji; and Ikeuchi, Mitsuru, to Ushio Denki Kabushiki Kaisha. Method for annealing semiconductors with a planar source composed of flash discharge lamps. 4,504,323, Cl. 148-1.500.

Arai, Yoshio: *See*—
Suzuki, Isao; Arai, Yoshio; and Kataoka, Hiroyuki, 4,504,969, Cl. 382-10.000.

Arakawa, Masatoshi; Yoshioka, Hayao; and Nakazawa, Kazuyoshi, to Japan Synthetic Rubber Co., Ltd. Process for producing 1,3-butadiene. 4,504,692, Cl. 585-633.000.

Araki, Shigeru; and Suzuki, Nobuhiko, to Alps Electric Co., Ltd. Present position display device. 4,504,910, Cl. 364-424.000.

Araps, Constance J.: *See*—
Anderson, Herbert R., Jr.; Araps, Constance J.; and Bates, Richard A., 4,504,007, Cl. 228-123.000.

Arasmith, Stanley D. Knife with improved cutting edge for producing novel wood flake. 4,503,895, Cl. 144-373.000.

Aratani, Matsuhiko: *See*—
Kitaura, Yoshihiko; Nakaguchi, Osamu; Hemmi, Keiji; Aratani, Matsuhiko; Takeno, Hidekazu; Okada, Satoshi; Tanaka, Hirokazu; Hashimoto, Masashi; Kuroda, Yoshio; Iguchi, Eiko; Kohsaka, Masanobu; Aoki, Hatsuo; and Imanaka, Hiroshi, 4,504,584, Cl. 435-253.000.

Arbed S.A.: *See*—
Weiner, Antoine, 4,504,311, Cl. 75-51.000.

Ardac, Inc.: *See*—
Murck, Sanford C.; and Dolejs, Anthony H., 4,504,052, Cl. 271-9.000.

Ares, Roland A.: *See*—
DiCarlo, Leonard J.; Ares, Roland A.; and Norton, Robert O., 4,503,685, Cl. 62-193.000.

Argabright, Perry A.; and Rhudy, John S., to Marathon Oil Company. Oil recovery process and system. 4,503,909, Cl. 166-252.000.

Ariizumi, Shoji: *See*—
Segawa, Makoto; and Ariizumi, Shoji, 4,504,746, Cl. 307-475.000.

Armco Inc.: *See*—
Binks, Richard H.; and Christ, Frederick C., 4,504,195, Cl. 417-172.000.
McClelland, John R.; Wright, Wade S.; Diamond, Edward P.; Pryor, Leroy C.; and Olson, Douglas R., 4,504,957, Cl. 373-130.000.

Armitage, Scott T., to Rockwell International Corporation. Digital circuit for generating ascending or descending ramp-like waveforms. 4,504,741, Cl. 307-228.000.

Armor, John N., to Allied Corporation. Catalytic oxidation of primary amines to oximes by elemental oxygen. 4,504,681, Cl. 564-267.000.

Armotek Industries, Inc.: *See*—
Andersen, Dennis, 4,503,769, Cl. 101-153.000.

Armstrong World Industries, Inc.: *See*—
Miller, Jesse D., Jr.; Tshudy, James A.; and Unruh, Ralph E., 4,504,523, Cl. 427-197.000.

Arneson, Leonard A.: *See*—
Pryputsch, Gunter G.; Leila, Lennox M.; Parkinson, Gerald E.; and Arneson, Leonard A., 4,503,760, Cl. 99-447.000.

Arnold, Dieter K., to Carl Schenck AG. Pressing apparatus for making particleboard. 4,504,207, Cl. 425-385.000.

Aro, Ean; DeHilster, Robert J.; and Bogan, Leonard E., to International Telephone and Telegraph Corporation. Line switch having distributed processing. 4,504,942, Cl. 370-58.000.

Arrhenius, Gustaf O.; Goldstein, Michael L.; and Moore, Candace X., to American Hospital Supply Corporation. Latent heat storage and supply system and method. 4,503,838, Cl. 126-263.000.

Arrington, John P., to Raychem Corporation. Method of transmitting UV light through optical fibers. 4,504,114, Cl. 350-96.340.

Arvin Industries, Inc.: *See*—
Brighton, John C., 4,504,294, Cl. 55-502.000.

Asahi Glass Company Ltd.: *See*—
Matsuo, Masashi; Itoh, Katsuji; Hayashi, Takao; and Oda, Yoshio, 4,504,401, Cl. 252-8.750.

Asahi-matsu Foods Inc.: *See*—
Kudo, Shiro; and Mukaiyama, Megumi, 4,504,514, Cl. 426-634.000.

Asai, Koichi; Oe, Kunio; and Tuda, Mamoru, to Fuji Machine Mfg. Co., Ltd. Method for automatically mounting non-lead electronic components on printed-circuit boards. 4,503,607, Cl. 29-832.000.

Asano, Isao, to Babcock-Hitachi Kabushiki Kaisha. Three o'clock welding method in narrow groove. 4,504,729, Cl. 219-137.00R.

Asanuma, Nobuyoshi: *See*—
Shimizu, Yasuo; Asanuma, Nobuyoshi; and Kami, Yozo, 4,504,081, Cl. 280-714.000.

Ashitaka, Hidetomo: *See*—
Ueno, Haruo; Ashitaka, Hidetomo; Jinda, Kazuya; and Nakajima, Kouichi, 4,504,639, Cl. 526-146.000.

Askam, John F.; and Coton, William H., to Dunlop Limited. Tire building machinery. 4,504,337, Cl. 156-64.000.

Assab Medicin AB: *See*—
Edebo, Lars B.; Swede, Harald G.; and Tornqvist, Nils-Erik, 4,503,873, Cl. 134-104.000.

Associated Mills, Inc.: *See*—
Rundzaitis, Alfons, 4,504,389, Cl. 210-266.000.

Asulab S.A.: *See*—
Schneiter, Ali; Fluckiger, Jean-Frederic; and Curchod, Anne, 4,504,703, Cl. 179-102.000.

AT&T Bell Laboratories: *See*—
Gallaher, Lee E.; Toy, Wing N.; and Zee, Benjamin, 4,504,902, Cl. 364-200.000.
Hartman, Robert L.; Koszi, Louis A.; and Schwartz, Bertram, 4,504,952, Cl. 372-45.000.
Johannes, Virgil I., 4,504,944, Cl. 370-84.000.
Johnson, Richard A.; and Mattes, Hans G., 4,504,922, Cl. 364-557.000.
Kosinski, Sandra G.; Lemaire, Paul J.; and O'Connor, Paul B., 4,504,297, Cl. 65-3.110.
MacChesney, John B.; and O'Connor, Paul B., 4,504,299, Cl. 65-3.120.
Macklin, John J.; Silfvast, William T.; and Wood, Obert R., II, 4,504,955, Cl. 372-76.000.
Moyer, Harold W., 4,504,427, Cl. 264-25.000.
Pilukaitis, Raymond W.; and Wilson, Thomas G., Jr., 4,504,898, Cl. 363-49.000.
Rutledge, Donald R., 4,503,676, Cl. 60-527.000.
White, Jonathan C., 4,504,949, Cl. 372-3.000.

AT&T Technologies, Inc.: *See*—
Kent, William C.; and Payne, Charles H., 4,504,008, Cl. 228-180.200.
Mackay, Robert D., 4,503,609, Cl. 29-843.000.

Atlani, Martial; Loutaty, Roben; Wakselman, Claude; and Yacono, Charles, to Compagnie Francaise de Raffinage; and Agence Nationale de Valorisation de la Recherche (ANVAR). Method of purifying a gas mixture containing undesirable gas compounds. 4,504,287, Cl. 55-53.000.

Atlantic Research Corporation: *See*—
Scheffee, Robert S., 4,504,277, Cl. 44-51.000.

Atlantic Richfield Company: *See*—
Dean, Barry D., 4,504,627, Cl. 525-205.000.

Atomic Energy of Canada Limited: *See*—
Chuang, Karl T.; and Everatt, Allan E., 4,504,426, Cl. 261-114.00R.

Aubert, Andre ; Valignat, Jean; and Wyon, Christophe, to Commissariat a l'Energie Atomique. Covering for photothermal conversion. 4,504,553, Cl. 428-622.000.

Auchapt, Pierre R.; and Ferlay, Aime J., to Commissariat a l'Energie Atomique. Process for the remote coating of the surfaces of a cavity, as well as the application of this process. 4,504,524, Cl. 427-230.000.

Audi Nsu Auto Union: *See*—
Lindner, Horst J.; Ufer, Peter P.; Heck, Klaus; and Schmoger, Gerhard, 4,504,370, Cl. 204-129.100.

Audi NSU Auto Union AG.: *See*—
Rossie, Egbert; and Feucht, Klaus, 4,503,639, Cl. 49-374.000.

Autelca AG: *See*—
Lindenmuller, Johann, 4,504,259, Cl. 493-23.000.

Autocon, Incorporated: *See*—
Murphy, Gerald J.; Pilie' , Walter E.; and Garaudy, Glenn, 4,503,875, Cl. 137-83.000.

Automatic Switch Company: *See*—
Johnson, Terence L.; and Guthreau, Lance, 4,503,887, Cl. 137-624.130.

Automotive Products, plc: *See*—
Wimbush, Maurice J., 4,503,678, Cl. 60-584.000.

AuYeung, John C., to California Institute of Technology. Tunable graded rod laser assembly. 4,504,950, Cl. 372-20.000.

Axmann, Arnold, to Siemens Aktiengesellschaft. Arrangement for controlling the operation of a grabbing crane for loading and unloading a ship. 4,504,918, Cl. 364-478.000.

Ayres, Barry E.: *See*—
O'Callaghan, Cynthia H.; Ayres, Barry E.; Livermore, David G. H.; Newall, Christopher E.; and Weir, Niall G., 4,504,477, Cl. 514-203.000.

Baak, Tryggve, to Schlumberger Technology Corporation. Reinforced and chemically resistant optical filament. 4,504,113, Cl. 350-96.330.

Baba, Kiyokazu, to Kabushiki Kaisha Komatsu Seisakusho. Device for splitting a pair of segmented transfer bars of a transfer press or the like. 4,503,969, Cl. 198-621.000.

Babcock-Hitachi Kabushiki Kaisha: *See*—
Asano, Isao, 4,504,729, Cl. 219-137.00R.

Babcock & Wilcox Company, The: *See*—
Hammond, Charles W., 4,503,811, Cl. 122-392.000.

Bacardit, Juan S., to Bendiberica S.A. Hydraulic power-assistance actuating mechanisms, especially for servo-assisted steering systems. 4,503,753, Cl. 91-375.00R.

Back-Ease Products, Inc.: *See*—
Licciardi, Anthony L., 4,503,845, Cl. 128-75.000.

Backe, Wolfgang; Weingarten, Franz; and Murrenhoff, Hubertus, to Linde Aktiengesellschaft. Hydrostatic drive systems. 4,503,674, Cl. 60-448.000.

Baessler, Lee R., to Aleksich, Bronco, Trustee for Grennamyer Trust I. Telemetry system for monitoring hospital patient temperature. 4,503,862, Cl. 128-736.000.

Baggett, Neil: *See*—
Barker, Sidney A.; Baggett, Neil; Stevenson, John; and deCourcy, David R., 4,504,314, Cl. 106-38.350.

Bailey, J. Barry W.: *See*—
Mackey, Phillip J.; and Bailey, J. Barry W., 4,504,309, Cl. 75-72.000.

Baker, Alan S., to Imperial Chemical Industries PLC. Emulsifying agents. 4,504,275, Cl. 44-51.000.

Baker, Alan S., to Imperial Chemical Industries PLC. Emulsifying agents. 4,504,276, Cl. 44-51.000.

Baker Oil Tools, Inc.: *See*—
Carmody, Michael A., 4,503,913, Cl. 166-319.000.

Bakermans, Johannes C. W.; and Korsunsky, Iosif, to AMP Incorporated. Leadless integrated circuit package housing having means for contact replacement. 4,504,887, Cl. 361-399.000.

Balakrishnan, Ramanatha V., to National Semiconductor Corporation. Schottky TTL integrated logic gate circuit with reduced speed power product. 4,504,744, Cl. 307-456.000.

Baldvins, Jon O.; and Puleo, Joseph, Jr., to Markem Corporation. Radiation imageable compositions containing hollow ceramic microspheres. 4,504,565, Cl. 430-138.000.

Ballendux, Gerardus M., to Allis-Chalmers Corporation. Transmission shift mechanism. 4,503,727, Cl. 74-477.000.

Balzano, Quirino: *See*—
Garay, Oscar M.; Siwiak, Kazimierz; and Balzano, Quirino, 4,504,834, Cl. 343-749.000.

Bando, Satoshi: *See*—
Murata, Yoshifumi; Igi, Keishiro; Narukawa, Hiroshi; Uetsuki, Masao; Bando, Satoshi; Kawai, Shuji; and Shirano, Kenji, 4,504,531, Cl. 428-35.000.

Bandukwalla, Phiroze: *See*—
Mount, Gordon L.; Bandukwalla, Phiroze; and Mulugeta, Jarso, 4,503,684, Cl. 62-115.000.

Bandy, Peter B.; Danen, John A.; Heise, Nyles N.; and Holtan, Donald C., to International Business Machines Corporation. Identification field scan apparatus. 4,504,873, Cl. 360-63.000.

Banks, Robert L.: *See*—
Kukes, Simon G.; and Banks, Robert L., 4,504,694, Cl. 585-643.000.

Bar, Helmut: *See*—
Voigt, Hartmut; Muck, Karl-Friedrich; Bar, Helmut; Mader, Herbert; Burg, Karlheinz; and Sextro, Gunter, 4,504,670, Cl. 549-347.000.

Barbe, Karl-Heinz; and Berger, Erich, to Hauni-Werke Korber & Co. KG. Apparatus for severing a running web of tipping paper or the like. 4,503,867, Cl. 131-95.000.

Barber, Edmund A., Jr. Chord display device for fretted string instrument. 4,503,748, Cl. 84-474.000.

Barker, Sidney A.; Baggett, Neil; Stevenson, John; and deCourcy, David R., to Foseco International Limited. Alkali metal silicate binder compositions. 4,504,314, Cl. 106-38.350.

Barkus, Lee A.; and Bright, Edward J., to AMP Incorporated. Release mechanism for a connector cover. 4,504,105, Cl. 339-75.0MP.

Barlow, Gordon A.; and Krutsch, John R., to Gordon Barlow Design. Educational toy with path creating tiles for a vehicle. 4,504,243, Cl. 446-447.000.

Barmag Barmer Maschinenfabrik AG: *See*—
Gerhartz, Siegmar, 4,504,024, Cl. 242-18.100.

Schippers, Heinz; Lenk, Erich; Martens, Gerhard; Mayer, Manfred; Pieper, Werner; and Putsch, Siegfried, 4,504,021, Cl. 242-18.100.

Barnes, Richard A., to General Electric Company. integrated circuit board system and an integrated circuit board assembly for application thereto. 4,504,821, Cl. 340-146.200.

Barnes, Ronald A. Seed treater and conveying apparatus. 4,503,803, Cl. 118-303.000.

Barth, Rudolf: *See—*
Guilino, Gunther; Barth, Rudolf; and Koppen, Werner, 4,504,128, Cl. 351-167.000.

Barthel, Pierre, to Freyssinet International (STUP). Elongated elements of pre-stressed concrete, adapted to be assembled end to end. 4,504,174, Cl. 405-252.000.

Bartholet, Stephen J.; and Sivaslian, Armen H., to Odetics, Inc. Horizontal actuator mechanism for the legs of a walking machine. 4,503,924, Cl. 180-8.600.

Bartholomew, Bruce J., to General Dynamics Corporation/Convair Div. System and method for time sharing laser system which also generates a local oscillator signal. 4,504,122, Cl. 350-388.000.

Bartoli, Roger F.: *See—*
Radzwill, John E.; and Bartoli, Roger F., 4,504,341, Cl. 156-102.000.

BASF Aktiengesellschaft: *See—*
Goetz, Norbert; Girgensohn, Bjoern; and Zanker, Fritz, 4,504,363, Cl. 203-14.000.
Schnabel, Rolf; Kissau, Gerd; Weitz, Hans-Martin; and Fischer, Rolf, 4,504,676, Cl. 560-244.000.

BASF Wyandotte Corporation: *See—*
Finnan, Jeffrey L., 4,504,499, Cl. 426-250.000.
Langdon, William K., 4,504,418, Cl. 260-463.000.

Basnett, Robert T., to Westinghouse Electric Corp. Vacuum contactor kickout spring adjustment apparatus. 4,504,808, Cl. 335-154.000.

Bates, Richard A.: *See—*
Anderson, Herbert R., Jr.; Araps, Constance J.; and Bates, Richard A., 4,504,007, Cl. 228-123.000.

Battarel, Andre P.; and Lequin, Claude G., to Societe Europeenne de Propulsion. Electromagnetic bearing for high temperature environment. 4,504,098, Cl. 308-10.000.

Battelle-Institut e.V.: *See—*
Guers, Karl; and Beck, Rasmus, 4,504,954, Cl. 372-61.000.

Battey, George L.: *See—*
Calvert, Nathaniel; and Battey, George L., 4,504,089, Cl. 297-214.000.

Bauer, Anton, to Braun Aktiengesellschaft. Control circuit for holding constant the operating voltage of an electric load. 4,504,777, Cl. 323-300.000.

Baxter Travenol Laboratories, Inc.: *See—*
Olson, Raymond G., 4,504,200, Cl. 417-476.000.
Rudzena, William L.; Frederick, Warren P.; and Stone, Albert, 4,504,265, Cl. 604-86.000.

Bayer Aktiengesellschaft: *See—*
Findeisen, Kurt; and Fauss, Rudolf, 4,504,673, Cl. 560-180.000.
Herwig, Jens; Scheef, Hans-Volker; Schleppinghoff, Bernhard; and Lange, Peter M., 4,504,688, Cl. 568-697.000.

Bayle, Rene : *See—*
Burkel, Rainer; Bayle, Rene ; Denamps, Jean; and Goussin, Roger, 4,504,770, Cl. 318-560.000.

Beam, Clark W.; and Crutchfield, Mark K., to Hydril Company. Ram blowout preventer securing and retracting apparatus. 4,504,037, Cl. 251-1.00A.

Beam, Donald H.: *See—*
Beam, Roger B.; and Beam, Donald H., 4,504,184, Cl. 414-498.000.

Beam, Roger B.; and Beam, Donald H. Combined hoist-dump assembly for trucks. 4,504,184, Cl. 414-498.000.

Beardmore, David H., to Phillips Petroleum Company. Combination of fuels. 4,504,211, Cl. 431-3.000.

Beaudet, Didier, to Societe Anonyme De Telecommunications. Device for regulating a laser diode. 4,504,976, Cl. 455-611.000.

Bebco Experimental and Manufacturing Company: *See—*
Jackson, Robert C., 4,503,735, Cl. 76-78.00R.

Becchi, Raffaele: *See—*
Ciampi, Paolo; and Becchi, Raffaele, 4,504,158, Cl. 400-144.200.

Beck, Jeffrey D.: *See—*
Schaake, Herbert F.; Tregilgas, John H.; and Beck, Jeffrey D., 4,504,334, Cl. 148-191.000.

Beck, Rasmus: *See—*
Guers, Karl; and Beck, Rasmus, 4,504,954, Cl. 372-61.000.

Becken, Richard H.: *See—*
Pilkington, Mervin V.; Creasey, Jack R.; and Becken, Richard H., 4,504,604, Cl. 523-167.000.

Becker, Klaus. Self oscillating, single-ended flyback converter with input voltage responsive control. 4,504,775, Cl. 320-32.000.

Beckman Instruments, Inc.: *See—*
Kampf, Richard S.; and Winn, Richard W., 4,503,964, Cl. 198-341.000.

Beckstead, Leo W.: *See—*
Voelker, Dennis E.; Beckstead, Leo W.; and Hogsett, Robert F., 4,504,448, Cl. 423-54.000.

Bedney, Harris I., to Deere & Company. Forward-folding agricultural implement featuring narrow row spacing. 4,504,076, Cl. 280-411.00A.

Beecham Group p.l.c.: *See—*
Gaster, Laramie M.; and Orlek, Barry S., 4,504,480, Cl. 514-214.000.

Beehler, Pavitt, Siegemund, Jagger & Martella: *See—*
Ducret, Robert P., 4,504,852, Cl. 358-11.000.

Beeks, Elaine C.: *See—*
Lewarchik, Ronald J.; Murphy, Edward J.; and Beeks, Elaine C., 4,504,374, Cl. 204-181.00C.

Beeloo, Leendert A., to Gas Power Systems, Inc. Flow control apparatus and method. 4,504,190, Cl. 415-166.000.

Begrich, Rainer; and Landre , Jean-Francois, to Ciba-Geigy Corporation. Reactive dyes, process for their preparation and use thereof. 4,504,273, Cl. 8-549.000.

BEI Electronics, Inc.: *See—*
Haville, George D., 4,504,776, Cl. 323-288.000.

Beiswenger, David W.: *See—*
Kessler, David R.; Beiswenger, David W.; and Makusij, Andrew J., 4,503,826, Cl. 123-470.000.

Belfoure, Edward: *See—*
Miller, Kenneth F.; and Belfoure, Edward, 4,504,634, Cl. 525-439.000.

Bell, Harvey; Lenchin, Julianne M.; and Zwiercan , Gary A., to National Starch & Chem. Corp. Liquid batter for coating foodstuffs and method of making same. 4,504,509, Cl. 426-549.000.

Bell & Howell Company: *See—*
Cloud, Wilbert L.; and Shaw, Steve, 4,503,976, Cl. 209-546.000.

Bell, Stanley C.: *See—*
Klaubert, Dieter H.; and Bell, Stanley C., 4,504,660, Cl. 544-163.000.

Bell, Steven A.; and Kruglak, Ivan T., to Coherent Communications, Inc. System for recording a time code signal on motion picture film. 4,504,130, Cl. 352-92.000.

Bellafiore, Francis V., to Chicago Bridge & Iron Company. Method of coating the walls of narrow vertical elongated spaces. 4,504,525, Cl. 427-230.000.

Bemis Company, Inc.: *See—*
Cooper, Barry A., 4,504,434, Cl. 264-22.000.

Ben-Dror, Jonathan: *See—*
Vardi, Isaih; Kimchi, Yigal; and Ben-Dror, Jonathan, 4,504,396, Cl. 210-800.000.

Bendiberica S.A.: *See—*
Bacardit, Juan S., 4,503,753, Cl. 91-375.00R.

Bendix Corporation: *See—*
Schneider, Michael J., 4,503,825, Cl. 123-446.000.

Beneteau, Donald J. Resistance welding apparatus with compound electrode holder. 4,504,725, Cl. 219-86.250.

Bennett, Edgar F.: *See—*
Cox, Samson A.; Bennett, Edgar F.; and Yule, Thomas J., 4,504,737, Cl. 250-435.000.

Bennett, Simon D.: *See—*
Kino, Gordon S.; Khuri-Yakub, Butrus T.; Bennett, Simon D.; and Liang, Kenneth K., 4,503,708, Cl. 73-628.000.

Benneyan, Gregoire: *See—*
Wolf, Franz-Josef; Pletsch, Hubert; and Benneyan, Gregoire, 4,504,244, Cl. 464-83.000.

Bennison, Stewart; and Linnik, Ronald L., to JSK Company Ltd. Bag opening machine. 4,504,183, Cl. 414-412.000.

Berger, Alfons: *See—*
Meinhardt, Heinrich; Berger, Alfons; and Zimmerman, Harald, 4,504,015, Cl. 241-3.000.

Berger, Erich: *See—*
Barbe, Karl-Heinz; and Berger, Erich, 4,503,867, Cl. 131-95.000.

Bergermann, Franz; and Prufer, Michael, to Triumph-Adler A.G. fur Buro und Informationstechnik. Method of displaying a text on a single-line display unit of a word processor. 4,504,825, Cl. 340-709.000.

Bergkvist, Hans; and Jaun, Hans, to Institut Cerac S.A. Rock drilling apparatus. 4,503,918, Cl. 175-27.000.

Berrey, Harry R.: *See—*
Bittner, John R.; Berrey, Harry R.; and Billings, Ralph S., 4,504,051, Cl. 270-40.000.

Bert, Stephen F., to Textron, Inc. Non-expansible linkage bracelet. 4,503,665, Cl. 59-82.000.

Berthel, Robert O. Heavy rain rate warning indicator. 4,504,823, Cl. 340-602.000.

Berthold, Rudiger, to Hoechst Aktiengesellschaft. Process for the preparation of arylhydrazine-N-sulfonic acids. 4,504,424, Cl. 260-513.600.

Bertsch, Carl F., to Exxon Research and Engineering Co. Passivation of cracking catalysts with cadmium and tin. 4,504,381, Cl. 208-113.000.

Beruto, Marco; Luzzi, Antonio; and Ramello, Piero, to Minnesota Mining and Manufacturing Company. Gelatin silver halide photographic elements for tanning development. 4,504,572, Cl. 430-264.000.

Berwick, James D.; and Lam, Kyle T., to Verbatim Corporation. Magnetic media test fixture apparatus. 4,504,871, Cl. 360-31.000.

Besecke, Siegmund; Siegert, Hermann-Josef; and Schroder, Gunter, to Rohm GmbH. Method for making isobutyric acid or esters thereof. 4,504,675, Cl. 560-233.000.

Betz Laboratories, Inc.: *See—*
Harpel, William L.; and Pilny, Richard J., 4,504,395, Cl. 210-712.000.

Bexten, Ludger: *See—*
Gartner, Roderich; Cornils, Boy; Bexten, Ludger; and Kupies, Dieter, 4,504,588, Cl. 502-24.000.

Bezdicek, Jan: *See—*
Novak, Jiri; Pjgrt, Jan; Bezdicek, Jan; Fenik, Milan; Kuda, Vladimir; and Vasicek, Vladimir, 4,503,891, Cl. 139-116.000.

Bianchi International: *See—*
Nichols, Richard D. E., 4,504,001, Cl. 224-198.000.

Bichara, Michel; Koensgen, Jean-Pierre; Bodu, Michel; Meriaux, Michel; and Zimmermann, Jean-Pierre, to Mines de Potasse d'Alsace S.A. Treatment of carnallitic ores. 4,504,092, Cl. 299-5.000.

Bien, Alfred A., to Chrysler Corporation. Telescopic shaft coupling arrangement. 4,504,164, Cl. 403-109.000.

Bierig, David A. Rotatable spar. 4,503,796, Cl. 114-89.000.

Biernoth, Gerhard; and Merk, Werner, to Lever Brothers Company. Fractionation of butterfat using a liquefied gas or a gas in the supercritical state. 4,504,503, Cl. 426-312.000.

Bifok AB: *See*—
Hansen, Elo H.; and Ruzicka, Jaromir, 4,504,443, Cl. 422-81.000.

Billings, Ralph S.: *See*—
Bittner, John R.; Berrey, Harry R.; and Billings, Ralph S., 4,504,051, Cl. 270-40.000.

Binks, Richard H.; and Christ, Frederick C., to Armco Inc. Jet pump for oil wells. 4,504,195, Cl. 417-172.000.

Binley, Gary N., to Thomas J. Lipton, Inc. Process for forming extruded ice confections and products formed thereby. 4,504,511, Cl. 426-565.000.

Bio-Scan, Inc.: *See*—
Sams, Marvin W.; and Wasson, Samuel L., 4,503,860, Cl. 128-639.000.

Biomedics, Inc.: *See*—
Entrekin, Robert R., 4,503,861, Cl. 128-661.000.

Bitronics, Inc.: *See*—
Brosh, Amnon; and Fiori, David, Jr., 4,503,922, Cl. 177-210.0EM.

Bittner, John R.; Berrey, Harry R.; and Billings, Ralph S., to Genicom Corporation. Continuous forms refolder for high speed printers. 4,504,051, Cl. 270-40.000.

Black, David J., to James W. Gardner Enterprises, Inc. Neutral flavored high stability peanut paste. 4,504,513, Cl. 426-632.000.

Blackwood, Carl I. R., to White Scientific Consultants Inc. Harmonic noise control in chopper type voltage regulators. 4,504,897, Cl. 363-39.000.

Blanchard, Clarence E., to Outboard Marine Corporation. Outboard motor with dual trim and tilt axes. 4,504,237, Cl. 440-61.000.

Bliley, Ward L., to Structural Fibers, Inc. Lined pressure vessels. 4,504,530, Cl. 428-35.000.

Bloemendal, Berend J.; and Grootte Bromhaar, Marinus J., to Delta Screw Nederland B.V. Apparatus adapted for use as a screw compressor for motor. 4,504,203, Cl. 418-201.000.

Blomkvist, Villhard: *See*—
Helle, Antti; and Blomkvist, Villhard, 4,504,344, Cl. 156-185.000.

Blossfeld, Lother, to ITT Industries, Inc. Process for manufacturing a monolithic integrated solid-state circuit having at least one insulated-gate field-effect transistor and at least one bipolar transistor. 4,503,603, Cl. 29-571.000.

Board of Regents, The University of Texas System: *See*—
Folkers, Karl; Bowers, Cyril Y.; Kubiak, Teresa M.; and Stepinski, Janusz, 4,504,414, Cl. 260-112.5LH.
Hanahan, Donald J.; and Pinckard, R. Neal, 4,504,474, Cl. 514-78.000.

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Bodu, Michel: *See*—
Bichara, Michel; Koensgen, Jean-Pierre; Bodu, Michel; Meriaux, Michel; and Zimmermann, Jean-Pierre, 4,504,092, Cl. 299-5.000.

Boebel, Manfred, to Richard Wolf GmbH. Hysteroscopes. 4,503,843, Cl. 128-4.000.

Boehme, Robert M., to Honeywell Information Systems Inc. Display apparatus for facilitating maintenance of computer equipment. 4,504,830, Cl. 340-815.310.

Boeing Company, The: *See*—
Andrews, Dana G., 4,504,031, Cl. 244-113.000.
Moji, Yukimori, 4,504,325, Cl. 148-6.200.
Pinson, George T., 4,503,751, Cl. 91-36.000.

Boenning, Robert A.: *See*—
Nasuta, Anthony T.; and Boenning, Robert A., 4,504,921, Cl. 364-550.000.

Boert, Konrad: *See*—
Moller, Dieter; and Boert, Konrad, 4,504,152, Cl. 366-188.000.

Bogan, Leonard E.: *See*—
Aro, Enn; DeHilster, Robert J.; and Bogan, Leonard E., 4,504,942, Cl. 370-58.000.

Bohlen, Harald; Engelke, Helmut; Greschner, Johann; and Nehmiz, Peter, to International Business Machines Corporation. Method of compensating the proximity effect in electron beam projection systems. 4,504,558, Cl. 430-30.000.

Bohm, Horst: *See*—
Stahl, Bernhard; and Bohm, Horst, 4,503,725, Cl. 74-424.80B.

Bohm, Rolland: *See*—
Davis, Clifford, 4,503,633, Cl. 42-51.000.

Bohn, David C., to Rosemount Inc. Travelling wave flowmeter. 4,503,711, Cl. 73-861.120.

Boik, Elmer J.; and Marshall, Frederick P., to Continental Group, Inc., The. Closure having means for retention in tubular container. 4,504,009, Cl. 229-5.500.

Bolieau, Christopher W., to Thiokol Corporation. Aft end igniter for full, head-end web solid propellant rocket motors. 4,503,773, Cl. 102-202.000.

Bond, Alan M.; Hudson, Henry A.; van den Bosch, Pierre A.; and Walter, Frederick L., to Deakin University. Monitoring of chemical species in solution and apparatus therefor. 4,504,367, Cl. 204-1.00T.

Bond, Gary M.; and Marshall, Albert H., to United States of America, Navy. Battlefield friend or foe indentification trainer. 4,504,232, Cl. 434-11.000.

Bonnard, Hubert: *See*—
Breque, Anne; Muller, Georges; Bonnard, Hubert; Mathey, Francois; and Savignac, Philippe, 4,504,683, Cl. 568-12.000.

Booker, Reginald A., to Du Pont de Nemours, E. I., and Company. In situ film hardening with pyridine-N-oxide and aldehyde precursor. 4,504,578, Cl. 430-621.000.

Borg-Warner Corporation: *See*—
Mott, Philip J., 4,504,246, Cl. 474-8.000.

Bosco, Peter M.: *See*—
Danielson, Robert L.; Bosco, Peter M.; and Steensen, Wayne L., 4,504,512, Cl. 426-579.000.

Bostick, David B., Sr. Lamp bank. 4,504,893, Cl. 362-253.000.

Bouchard, Sylvain L.: *See*—
Conway, Larry J.; Tucker, Trevor W.; and Bouchard, Sylvain L., 4,504,791, Cl. 328-15.000.

Boulier, Laurent L., to Delachaux, C. Process for the production of high purity metals or alloys. 4,504,310, Cl. 75-27.000.

Boult, George W.; and King, Richard R., to Molins PLC. Cigarette or filter rod cut-off device. 4,503,866, Cl. 131-84.00C.

Bourgery, Guy R.: *See*—
Moinet, Gerard H.; Dostert, Philippe L.; and Bourgery, Guy R., 4,504,663, Cl. 546-144.000.

Bournonville, Jean-Paul: *See*—
Trinh Dinh, Chan; and Bournonville, Jean-Paul, 4,504,593, Cl. 502-154.000.

Boute, Willem; Wittkampf, Frederik H. M.; van Arragon, Gerrit W.; and Mensink, Kornelis A., to Vitatron Medical B.V. Programmable cardiac pacemaker with microprocessor control of pacer rate. 4,503,857, Cl. 128-419.0PG.

Boutin, Jean; and Neel, Jean, to Rhone-Poulenc Industries. (Meth)acrylic acid/methallylsulfonate copolymers. 4,504,643, Cl. 526-287.000.

Bouzard, Daniel; Weber, Abraham; and Stemer, Jacques, to Bristol-Myers Company. Cephadroxil monohydrate. 4,504,657, Cl. 544-30.000.

Bowers, Cyril Y.: *See*—
Folkers, Karl; Bowers, Cyril Y.; Kubiak, Teresa M.; and Stepinski, Janusz, 4,504,414, Cl. 260-112.5LH.

Bowman, Wayne A.: *See*—
Abel, Edward P.; and Bowman, Wayne A., 4,504,569, Cl. 430-214.000.

Bradburn, Marvin D.: *See*—
Woods, Richard E.; and Bradburn, Marvin D., 4,503,763, Cl. 100-35.000.

Brand, Robert D.; and Runyan, Ralph D., to Capital Machine Company, Inc. Optical cutting edge locator for a cutting apparatus. 4,503,740, Cl. 83-521.000.

Brand, Robert D., to Capital Machine Company, Inc. Dog system for veneer slicer. 4,503,896, Cl. 144-369.000.

Braner Enterprises: *See*—
Richards, Lawrence J., 4,504,186, Cl. 414-744.00A.

Braschel, Volker; Jonner, Wolf-Dieter; and Leiber, Heinz, to Robert Bosch GmbH. Vehicle wheel brake anti-lock system with low speed control. 4,504,911, Cl. 364-426.000.

Brauer, Eric A., to RCA Corporation. Stylus cartridge having stylus arm restraint. 4,504,941, Cl. 369-170.000.

Braun Aktiengesellschaft: *See*—
Bauer, Anton, 4,504,777, Cl. 323-300.000.

Braun, Ronald C.: *See*—
Giannuzzi, Ottavio; and Braun, Ronald C., 4,503,788, Cl. 112-121.120.

Braunroth, Klaus. Disposable face mask with odor masking attachment. 4,503,851, Cl. 128-203.290.

Brazdil, Miroslav: *See*—
Sorm, Miloslav; Langpaul, Josef; Ulbert, Karel; Kadlec, Karel; Skalicky, Stanislav; Brazdil, Miroslav; Nespurek, Stanislav; Kensa, Jaromir; Zvonicek, Miroslav; and Hrdina, Zdenek, 4,503,996, Cl. 222-321.000.

Brazeau, Marilyn I.: *See*—
Sitko, Jerry A.; Hrynkiw, John; and Brazeau, Marilyn I., 4,503,992, Cl. 220-90.400.

Breque, Anne; Muller, Georges; Bonnard, Hubert; Mathey, Francois; and Savignac, Philippe, to Institut National de Recherche Chimique Appliquee (IRCHA); and Centre National de la Recherche Scientifique. Phospholes with functional substituents on the phosphorus and process for the preparation of phospholes. 4,504,683, Cl. 568-12.000.

Breton, Jacques. Regulated-current source and controlled-voltage generator. 4,504,882, Cl. 361-93.000.

Breuer, Hans; Rindelaub, Frank; and Velebil, Gerhard, to BRV Technologie-Systeme AG. Process for the treatment of organic fall-out products. 4,504,394, Cl. 210-632.000.

Bright, Edward J.: *See*—
Barkus, Lee A.; and Bright, Edward J., 4,504,105, Cl. 339-75.0MP.

Brighton, John C., to Arvin Industries, Inc. Exhaust processor assembly. 4,504,294, Cl. 55-502.000.

Brill, Winston J.; and von Meyer, William C., to Agracetus. Method and composition for control of termite and shipworms. 4,504,468, Cl. 424-147.000.

Bristol-Myers Company: *See*—
Bouzard, Daniel; Weber, Abraham; and Stemer, Jacques, 4,504,657, Cl. 544-30.000.
Hanada, Minoru; Tsunakawa, Mitsuaki; Tomita, Koji; Tsukiura, Hiroshi; and Kawaguchi, Hiroshi, 4,504,580, Cl. 435-74.000.

British Telecommunications: *See*—
Nicol, Richard C.; Fenn, Brian A.; Clarke, Roger J.; and Ngan, King N., 4,504,860, Cl. 358-133.000.

Broberg, David K.: *See—*
Janko, Mike A.; and Broberg, David K., 4,504,851, Cl. 358-10.000.
Brocks, Dietrich: *See—*
Timpl, Rupert; Brocks, Dietrich; Neubauer, Horst; and Strecker, Helmut, 4,504,587, Cl. 436-538.000.
Brose Fahrzeugteile GmbH & Co.: *See—*
Schust, Gerhard, 4,503,732, Cl. 74-625.000.
Brosh, Amnon; and Fiori, David, Jr., to Bitronics, Inc. Electronic bathroom scale apparatus using planar coil sensors. 4,503,922, Cl. 177-210.0EM.
Brovold, Thomas E., to MTS Systems Corporation. Servovalve spool control for digital rotary servovalve. 4,503,888, Cl. 137-625.650.
Brown, David J. Heated ceiling fan. 4,504,191, Cl. 416-5.000.
Brown, Dennis N. Orthotic appliance and method of making. 4,503,576, Cl. 12-146.00M.
Brown, Milton F., Jr.; and Anderson, Darl. Apparatus for operating a plurality of control circuits having a common conductor and a circuit therefor. 4,504,082, Cl. 280-735.000.
Brown, Omar L.; Peters, Don B.; and Schubert, James R., to Fraze, Ermal C. Can end with retained tear strip. 4,503,989, Cl. 220-269.000.
Brown & Williamson Tobacco Corporation: *See—*
Cantrell, Daniel V.; Bryant, Herman G., Jr.; Jones, Robert L.; Maccaferri, Marco A.; and McDaniel, William M., 4,503,869, Cl. 131-336.000.
Broz, Thomas A.: *See—*
O'Connell, Daniel D.; and Broz, Thomas A., 4,504,602, Cl. 521-78.000.
Bruderle, Ernst; and Reindler, Albrecht, to Messerschmitt-Bolkow-Blohm Gesellschaft mit beschrankter Haftung. Satellites and roll-/yaw controls therefor. 4,504,912, Cl. 364-434.000.
Brunner, Rudolf, to Heilmeier & Weinhlein Fabrik fur Oel-Hydraulik GmbH & Co. KG. Flow valve. 4,503,882, Cl. 137-454.500.
Brunswick Corporation: *See—*
Neisen, Gerald F., 4,504,238, Cl. 440-89.000.
BRV Technologie-Systeme AG: *See—*
Breuer, Hans; Rindelaub, Frank; and Velebil, Gerhard, 4,504,394, Cl. 210-632.000.
Bryant, Herman G., Jr.: *See—*
Cantrell, Daniel V.; Bryant, Herman G., Jr.; Jones, Robert L.; Maccaferri, Marco A.; and McDaniel, William M., 4,503,869, Cl. 131-336.000.
Bryant, Jimmy R.; Mertens, Waldemar W.; and Kenny, Frances A., to Emerson Electric Co. Dual terminal for dynamoelectric machine starting switch. 4,504,710, Cl. 200-80.00R.
BS&B Engineering Company Inc.: *See—*
Markus, Gerardus A., 4,504,213, Cl. 431-116.000.
Bube, Carsten; Thiele, Gerd; and Zeller, Hans, to Robert Bosch GmbH. Simulative temperature controller for a motor vehicle. 4,504,732, Cl. 219-497.000.
Buchwalter Stephen L., to PPG Industries, Inc. Acrylic polymers and the Michael adducts thereof useful in coating applications. 4,504,630, Cl. 525-296.000.
Buckley, Richard D., to Westinghouse Electric Corp. Method of making a cellulose-free electrical winding. 4,503,605, Cl. 29-605.000.
Buffa, Gerard: *See—*
Jarret, Bertrand; Cordier, Rose; and Buffa, Gerard, 4,504,975, Cl. 455-608.000.
Buller, Richard J.: *See—*
Johnson, John F.; Buller, Richard J.; and Guinn, Ronald K., 4,503,643, Cl. 51-247.000.
Bulso, Joseph D., Jr.; and Doyle, Stephen D., to Redicon Corporation. Tapered container and method and apparatus for forming same. 4,503,702, Cl. 72-349.000.
Bunn-O-Matic Corporation: *See—*
Daugherty, Donald L., 4,503,757, Cl. 99-281.000.
Burckhardt, Manfred; and Schulte, Herbert, to Daimler-Benz Aktiengesellschaft. Device for cooling motor vehicle wheels. 4,503,944, Cl. 188-71.600.
Burg, Karlheinz: *See—*
Voigt, Hartmut; Muck, Karl-Friedrich; Bar, Helmut; Mader, Herbert; Burg, Karlheinz; and Sextro, Gunter, 4,504,670, Cl. 549-347.000.
Burke Industries, Inc.: *See—*
Gerber, Dennis H., 4,503,988, Cl. 220-219.000.
Burke, Lawrence H.: *See—*
Viola, Frank J.; Schaub, Erwin L.; and Burke, Lawrence H., 4,504,816, Cl. 337-255.000.
Burkel, Rainer; Bayle, Rene ; Denamps, Jean; and Goussin, Roger, to Robert Bosch GmbH. Adjusting device for rotary angle adjustment of a final control element. 4,504,770, Cl. 318-560.000.
Burkner, Wolfgang, to Carl Schenck AG. Procedure for controlling the density distribution of wood chips and device therefor. 4,504,182, Cl. 414-327.000.
Burlington Industries, Inc.: *See—*
Petracek, Vaclav; and Wang, Kenneth Y., 4,504,539, Cl. 428-195.000.
Burrage, Robert G., to Lucas Industries PLC. Digital control system including means for maintaining signals supplied thereby within limiting values. 4,504,905, Cl. 364-200.000.
Burroughs Wellcome Co.: *See—*
Wilkinson, Samuel; and Hardy, George W., 4,504,492, Cl. 514-522.000.
Burrows, Donald L., to Everest and Jennings Canadian Limited. Drive mechanism for invalid carriages. 4,504,094, Cl. 301-6.00R.
Burton Energy and Solar Technology Inc.: *See—*
Chertok, Burton Z., 4,503,840, Cl. 126-444.000.
Buschbom, Floyd E.; and Henke, Donald L., to Veda, Inc. Material mixing apparatus. 4,504,253, Cl. 474-114.000.
Bussink, Jan: *See—*
Heuschen, Jean M. H.; Bussink, Jan; and Sederel, Willem L., 4,504,623, Cl. 525-67.000.
Heuschen, Jean M. H.; Bussink, Jan; and Sederel, Willem L., 4,504,624, Cl. 525-67.000.
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Byggnads-& Industriservice AB Binab: *See—*
Lindberg, Bertil J.; and Elmefjall, Bernt C. G., 4,504,176, Cl. 405-271.000.
Bystrianyk, Wasyl; Walker, Richard A.; Gardner, Edward B.; and Iacovazzi, Michael A. Individually controlled interceptors for glassware forming machines. 4,504,301, Cl. 65-66.000.
Cahill, Lysle D.: *See—*
Thomas, E. Raymond; Cahill, Lysle D.; Tibbits, John L.; Fraser, Kenneth D.; Keane, John F.; Harting, Stanley C.; Kramer, George H.; Duke, Ronald J.; Kessis, Theodore A.; Butler, John C.; Frank, Gary L.; and Lawson, John A., 4,504,126, Cl. 350-469.000.
Cailloux, Jean-Francois. Machine for fashioning vegetables and similar products. 4,503,761, Cl. 99-486.000.
California Institute of Technology: *See—*
AuYeung, John C., 4,504,950, Cl. 372-20.000.
Caligen Foam Limited: *See—*
Collishaw, Peter S.; and Wilkinson, Michael, 4,503,801, Cl. 118-246.000.
Callan, John E., to Allen-Bradley Company. Programmable controller with expandable I/O interface circuitry. 4,504,927, Cl. 364-900.000.
Calvert, Nathaniel; and Battey, George L. Liquid-cushioned bicycle seat. 4,504,089, Cl. 297-214.000.
Calvignac, Jean L.; and Castel, Rene R., to International Business Machines Corporation. Communication line adapter for use with a communications controller. 4,504,901, Cl. 364-200.000.
Cameron Iron Works, Inc.: *See—*
Taylor, Kennard W., 4,503,878, Cl. 137-315.000.
Campagnuolo, Carl H., to United States of America, Army. Self-regulating air driven power supply. 4,503,774, Cl. 102-207.000.
Campbell Soup Company: *See—*
Gaehring, David P.; and Scanlon, John V., 4,504,504, Cl. 426-321.000.
Canada, Her Majesty the Queen in right of, as represented by Minister of National Defence of Her Majesty's Canadian Government: *See—*
Conway, Larry J.; Tucker, Trevor W.; and Bouchard, Sylvain L., 4,504,791, Cl. 328-15.000.
Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence of Her Majesty's Canadian Government: *See—*
Tucker, Trevor W.; and Conway, Larry J., 4,504,785, Cl. 324-77.00H.
Canon Denshi Kabushiki Kaisha: *See—*
Hirano, Hirofumi; and Hasumi, Hitoshi, 4,504,159, Cl. 400-148.000.
Canon Kabushiki Kaisha: *See—*
Aoki, Takao; Kadowaki, Hidejiro; and Iwami, Naoki, 4,504,137, Cl. 355-4.000.
Kawabata, Takashi, 4,504,135, Cl. 354-402.000.
Kimura, Hiroyuki, 4,504,131, Cl. 354-173.100.
Kuroki, Yoichi; Yoshinari, Yukihiro; and Hiraga, Ryozo, 4,504,148, Cl. 356-401.000.
Kuwayama, Tetsuro, 4,504,855, Cl. 358-44.000.
Saito, Syuichiro, 4,504,866, Cl. 358-213.000.
Yamamoto, Hiroshi; Katsuma, Makoto; Murakami, Hiroyasu; and Hiramatsu, Akira, 4,504,760, Cl. 310-323.000.
Yoshikawa, Masao; Kan, Fumitaka; and Satomura, Hiroshi, 4,504,136, Cl. 355-3.0DD.
Cantrell, Daniel V.; Bryant, Herman G., Jr.; Jones, Robert L.; Maccaferri, Marco A.; and McDaniel, William M., to Brown & Williamson Tobacco Corporation. Cigarette mouthpiece. 4,503,869, Cl. 131-336.000.
Cantrell, John L., to Ribi ImmunoChem Research, Inc. Pyridine soluble extract of a microorganism. 4,504,473, Cl. 424-195.100.
Capital Machine Company, Inc.: *See—*
Brand, Robert D.; and Runyan, Ralph D., 4,503,740, Cl. 83-521.000.
Brand, Robert D., 4,503,896, Cl. 144-369.000.
Car-Go, Corp.: *See—*
Woods, Richard E.; and Bradburn, Marvin D., 4,503,763, Cl. 100-35.000.
Carbocol Inc.: *See—*
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Carl Freudenberg, Firma: *See—*
Holzer, Helmut, 4,504,068, Cl. 277-164.000.
Carl Schenck AG.: *See—*
Arnold, Dieter K., 4,504,207, Cl. 425-385.000.
Burkner, Wolfgang, 4,504,182, Cl. 414-327.000.
Carlingswitch, Inc.: *See—*
Donnelly, James; and Ives, Milton N., 4,504,712, Cl. 200-159.00R.
Nar, Ramesh, 4,504,807, Cl. 335-61.000.
Carlisle, Thomas A.; Smith, Phillip R.; and Thorn, Frank H., deceased (by Thorn, Carl L., Ernest F. Thorn, Alexandra L. Thorn, heirs), to Phillips Petroleum Company. Automatic drying tower switching system. 4,504,286, Cl. 55-20.000.

Carlsen, W. John; and Melman, Paul, to GTE Laboratories Incorporated. Interferometric multimode fiber optic switch and modulator. 4,504,121, Cl. 350-385.000.

Carman, Justice N. Homogenizing apparatus glass making furnace and method of homogenizing glass. 4,504,302, Cl. 65-136.000.

Carmody, Michael A., to Baker Oil Tools, Inc. Subsurface well safety valve. 4,503,913, Cl. 166-319.000.

Carpenter, Kent H.; and Laferty, John M., to Amax Inc. Process for producing ammonium metatungstate. 4,504,461, Cl. 423-593.000.

Carr, Edward H.; Knight, Harry W.; and Turnock, Richard C., to Imperial Chemical Industries PLC. Equipment for testing electrical devices such as solenoids. 4,504,789, Cl. 324-418.000.

Carre, Jean-Jacques; Pressaco, Pierre; and Mery, Jean-Claude, to Societe Anonyme D.B.A. Drum brake and the spacer for such a brake. 4,503,949, Cl. 188-79.50P.

Carrier Corporation: *See—*
Mount, Gordon L.; Bandukwalla, Phiroze; and Mulugeta, Jarso, 4,503,684, Cl. 62-115.000.
Traver, Darwin G.; Anderson, Carl M.; and Abdelhamid, Amr N., 4,504,188, Cl. 415-1.000.

Carrow, Guy E., to Phillips Petroleum Company. Pipe tee. 4,504,086, Cl. 285-156.000.

Carter, Donald. Lifting device. 4,504,088, Cl. 294-65.500.

Cartz, Louis; Weiss, Arnold; Schutten, Herman P.; Spellman, Gordon B.; Jaskolski, Stanley V.; and Wackman, Peter H., deceased (by Wackman, Connie M., personal representative), to Eaton Corporation. Laser beam plasma pinch X-ray system. 4,504,964, Cl. 378-119.000.

Carville, James G., to Alco Foodservice Equipment Company. Toaster. 4,503,758, Cl. 99-329.0RT.

Casio Computer Co., Ltd.: *See—*
Usui, Minoru, 4,504,829, Cl. 340-756.000.

Caspar, Wolfhard; and Lutze, Theodor, to Aesculap-Werke Aktiengesellschaft. Osteosynthesis plate. 4,503,848, Cl. 128-92.00D.

Castel, Rene R.: *See—*
Calvignac, Jean L.; and Castel, Rene R., 4,504,901, Cl. 364-200.000.

Cather, Douglas A., Jr., to Garlock Inc. High pressure shaft seal with low-friction lip liner. 4,504,067, Cl. 277-153.000.

Cecere, Mirella; Gozzo, Franco; and Signorini, Ernesto, to Montedison S.p.A. Derivatives of azoles having phytogrowth regulating activity. 4,504,303, Cl. 71-76.000.

Celanese Corporation: *See—*
Floyd, Terry S.; and Williams, James A., 4,503,593, Cl. 28-263.000.
Misenheimer, James R., 4,503,704, Cl. 73-159.000.

Cennamo, Arthur J. Universal V-belt. 4,504,257, Cl. 474-256.000.

Centre National de la Recherche Scientifique: *See—*
Breque, Anne; Muller, Georges; Bonnard, Hubert; Mathey, Francois; and Savignac, Philippe, 4,504,683, Cl. 568-12.000.

Centre National du Machinisme Agricole, du Genie Rural, des Eaux et des Forets: *See—*
Lucas, Jean; Goupillon, Jean-Francois; and Drouin, Bernard, 4,503,767, Cl. 100-214.000.

Century Fabrications Ltd.: *See—*
Hobbs, Albert W., 4,504,077, Cl. 280-490.00R.

Cervenec, Stephen W.; and Stender, Ronald L., to Schindler Haughton Elevator Corporation. Elevator control circuit. 4,503,937, Cl. 187-29.00R.

Ceskoslovenska akademie ved: *See—*
Sorm, Miloslav; Langpaul, Josef; Ulbert, Karel; Kadlec, Karel; Skalicky, Stanislav; Brazdil, Miroslav; Nespurek, Stanislav; Kensa, Jaromir; Zvonicek, Miroslav; and Hrdina, Zdenek, 4,503,996, Cl. 222-321.000.

Chadwick, Dennis P., to Urban Transportation Development Corporation Ltd. Interconnecting passage for articulated vehicle. 4,503,779, Cl. 105-4.00R.

Chaki, Takao, to Clarion Co., Ltd. Pushbutton-operated waveband or station selector. 4,503,720, Cl. 74-10.330.

Challenger Circle F, Inc.: *See—*
Fiumefreddo, John; and Tibolla, Julius F., 4,504,108, Cl. 339-128.000.
Leong, Henry; and Fiumefreddo, John, 4,504,104, Cl. 339-63.00R.

Champion International Corporation: *See—*
Lillibridge, Harold R., 4,504,260, Cl. 493-249.000.

Chan, Johnny C., to Lighting Concept Products Limited. Torches. 4,504,890, Cl. 362-203.000.

Chana, Howard E.; and Stordahl, Calmer M., to General Motors Corporation. Control mechanism for a variable ratio drive system. 4,504,247, Cl. 474-17.000.

Chang, Chieh; and Lee, Man S., to GTE Lenkurt Incorporated. Switched capacitor balanced modulator/demodulator. 4,504,804, Cl. 332-31.00R.

Chang, Chieh: *See—*
Lee, Man S.; and Chang, Chieh, 4,504,803, Cl. 332-31.00R.

Chang, Robert C.; and McCoy, Dale E., to Owens-Corning Fiberglas Corporation. Irimellitic anhydride-containing unsaturated polyesters. 4,504,619, Cl. 524-524.000.

Chapin, Howard R.; and Gurley, Arnold E., to Littelfuse, Inc. Sealed electrical devices. 4,504,697, Cl. 174-52.00R.

Chapline, Thomas: *See—*
Jones, Corey N.; and Chapline, Thomas, 4,504,235, Cl. 434-219.000.

Chappell, Terry I.; and Woodall, Jerry M., to International Business Machines Corporation. Multiwavelength optical-to-electrical logic operations. 4,504,846, Cl. 357-12.000.

Charvat, Vernon K., to Superior Finishers, Incorporated. Cushioned abrasive articles, and method of manufacture. 4,504,283, Cl. 51-298.000.

Chatlos, Richard, to Air-O-Scoop Corporation. Attachment for motor vehicles with rear windows. 4,503,756, Cl. 98-2.120.

Chaumard, Yvette. Apparatus for storing and dispensing parallelepipedic objects and packets, particularly packets of cigarettes, boxes and other articles. 4,504,100, Cl. 312-71.000.

Chemical Research & Licensing Company: *See—*
Jones, Edward M., Jr., 4,504,687, Cl. 568-697.000.

Chen, Jamin; Khonsari, Ali M.; and Suciu, George D., to Lummus Company, The. Phenol purification. 4,504,364, Cl. 203-45.000.

Chen, Johnson C. H.; and Eichelberger, John L., to Pennwalt Corporation. Encapsulated phase change thermal energy storage materials. 4,504,402, Cl. 252-70.000.

Chen, Sow-Mei L.: *See—*
Floyd, Middleton B., Jr.; Weiss, Martin J.; Grudzinskas, Charles V.; and Chen, Sow-Mei L., 4,504,417, Cl. 260-438.100.

Cheng, Chia C., to Warner Lambert Company. 3-(Haloethyl)-4-oxopyrazolo[5,1-D]-1,2,3,5-tetrazine-8-carboxamide compounds. 4,504,475, Cl. 514-413.000.

Chertok, Burton Z., to Burton Energy and Solar Technology Inc. Solar energy and venting systems. 4,503,840, Cl. 126-444.000.

Chevrier, Rene R.; and Schatz, Bernard B. Automatic gage measuring machine. 4,503,617, Cl. 33-174.00L.

Chevron Research Company: *See—*
Davies, Bryan T., 4,504,393, Cl. 210-614.000.
Englander, Hank E., 4,504,444, Cl. 422-100.000.
Gould, Gordon; Soodak, Charles I.; and Thompson, Robert E., 4,504,112, Cl. 350-96.230.
Kurkov, Victor P., 4,504,486, Cl. 514-380.000.
Pyle, Walter R., 4,503,994, Cl. 222-64.000.
Spatz, David M., 4,504,484, Cl. 514-357.000.

Chiao, Samuel Y., to NCR Corporation. Oxide trench structure for polysilicon gates and interconnects. 4,503,601, Cl. 29-571.000.

Chiba, Yasutsune: *See—*
Toyoda, Akira; and Chiba, Yasutsune, 4,504,198, Cl. 417-417.000.

Chicago Bridge & Iron Company: *See—*
Bellafiore, Francis V., 4,504,525, Cl. 427-230.000.

Chip Supply: *See—*
Ruggieri, Joseph A., 4,504,155, Cl. 368-121.000.

Chittleborough, Michael, to Mars Incorporated. Coin handling device. 4,503,961, Cl. 194-1.00C.

Chiyoda, Akiyoshi: *See—*
Yasuda, Kazuo; Funabashi, Kyo; and Chiyoda, Akiyoshi, 4,504,541, Cl. 428-264.000.

Chlanda, Frederick P.: *See—*
Mani, Krishnamurthy N.; and Chlanda, Frederick P., 4,504,373, Cl. 204-180.00P.

Chloride Group Public Limited Company: *See—*
Pearson, Ernest J., 4,504,556, Cl. 429-136.000.

Christ, Frederick C.: *See—*
Binks, Richard H.; and Christ, Frederick C., 4,504,195, Cl. 417-172.000.

Christian, Robert F., to Jude Engineering, Inc. Screw conveyer and furnace. 4,504,222, Cl. 432-139.000.

Christianson, Tony. Pilot controlled regulator second stage. 4,503,852, Cl. 128-204.260.

Christidis, Yani: *See—*
Schouteeten, Alain; and Christidis, Yani, 4,504,678, Cl. 562-470.000.

Christoff, William J., to Rockwell International Corporation. Aircraft environmental control system with auxiliary power output. 4,503,666, Cl. 60-39.070.

Chrysler Corporation: *See—*
Bien, Alfred A., 4,504,164, Cl. 403-109.000.
Hall, John F., 4,503,885, Cl. 137-574.000.

Chu, Chin-Chiun, to Mobil Oil Corporation. Catalysts for para-ethyltoluene dehydrogenation. 4,504,594, Cl. 502-184.000.

Chuang, Karl T.; and Everatt, Allan E., to Atomic Energy of Canada Limited. Gas-liquid contacting apparatus. 4,504,426, Cl. 261-114.00R.

Church, Mark A.; and Decker, Stephen K., to International Business Machines Corporation. Integrated magnetic recording head assembly including an inductive write subassembly and a magnetoresistive read subassembly. 4,504,880, Cl. 360-113.000.

Ciampi, Paolo; and Becchi, Raffaele, to Ing. C. Olivetti & C., S.p.A. Positioning device for a selection member of printing machines. 4,504,158, Cl. 400-144.200.

Ciba-Geigy Corporation: *See—*
Begrich, Rainer; and Landre , Jean-Francois, 4,504,273, Cl. 8-549.000.
Dexter, Martin; and Winter, Roland A. E., 4,504,419, Cl. 260-465.00D.
Kirchmayr, Rudolf; and Rutsch, Werner, 4,504,372, Cl. 204-159.150.
Schumacher, Rolf; and Grubenmann, Arnold, 4,504,404, Cl. 252-33.400.

Cirjak, Larry M.; and Sutherland, Lynne, to Standard Oil Company, The. Process for the photocatalytic isomerization of olefins utilizing a mixed metal cluster. 4,504,371, Cl. 204-158.00R.

Citizen Watch Company Limited: *See—*
Honda, Yasuhiro; Ueno, Katumi; Nishizaki, Genichi; Kitahara, Harumi; and Kamioka, Hiroshi, 4,503,606, Cl. 29-701.000.
Shiba, Kazuo; Takahashi, Masao; Kanai, Akira; and Koizumi, Kouichi, 4,504,048, Cl. 269-71.000.

Clarion Co., Ltd.: *See—*
Chaki, Takao, 4,503,720, Cl. 74-10.330.

Clark, Bernard A.; Simons, Michael J.; and Holstead, Colin, to Eastman Kodak Company. Sensitive silver halide photothermographic materials for producing dye images. 4,504,568, Cl. 430-203.000.

Clark, Melville, Jr.; and Luce, David A., to Clark, Melville, Jr. Musical instrument. 4,503,745, Cl. 84-1.100.
Clarke, Roger J.: *See*—
Nicol, Richard C.; Fenn, Brian A.; Clarke, Roger J.; and Ngan, King N., 4,504,860, Cl. 358-133.000.
Clement, Burke. Masonry bit. 4,503,920, Cl. 175-394.000.
Clinton, John D.; and Reusswig, Gerhard H., to Mobil Oil Corporation. Caisson shield for arctic offshore production platform. 4,504,172, Cl. 405-217.000.
Cloud, Wilbert L.; and Shaw, Steve, to Bell & Howell Company. Envelope tracking system for mail sorting machines. 4,503,976, Cl. 209-546.000.
Cluff, Stephen L.; and Strolle, Clifford H., to Du Pont de Nemours, E. I., and Company. Oxazoline polyester oligomers. 4,504,620, Cl. 524-602.000.
Coherent Communications, Inc.: *See*—
Bell, Steven A.; and Kruglak, Ivan T., 4,504,130, Cl. 352-92.000.
Collishaw, Peter S.; and Wilkinson, Michael, to Caligen Foam Limited; and W. E. Saxby (Nottingham) Limited. Apparatus for impregnating or dispersing a product in a thin substrate. 4,503,801, Cl. 118-246.000.
Columbus Industries, Inc.: *See*—
Pontius, Harold T., 4,504,290, Cl. 55-316.000.
Combustion Control Developments Ltd.: *See*—
Lindberg, John E., 4,503,813, Cl. 123-25.00E.
Combustion Engineering, Inc.: *See*—
Sump, Cord H., 4,504,440, Cl. 419-3.000.
Commissariat a l'Energie Atomique: *See*—
Aubert, Andre ; Valignat, Jean; and Wyon, Christophe, 4,504,553, Cl. 428-622.000.
Auchapt, Pierre R.; and Ferlay, Aime J., 4,504,524, Cl. 427-230.000.
Compagnie de Construction Mecanique Sulzer: *See*—
Mallen-Herrero, Jose ; and Leroy, Daniel, 4,503,928, Cl. 180-308.000.
Compagnie Francaise de Raffinage: *See*—
Atlani, Martial; Loutaty, Roben; Wakselman, Claude; and Yacono, Charles, 4,504,287, Cl. 55-53.000.
Compagnie Generale de Constructions Telephoniques: *See*—
Meunter, Bernard; and Gradeler, Eric, 4,504,702, Cl. 179-99.00A.
Composite Technology, Inc.: *See*—
Green, Andrew, 4,504,343, Cl. 156-177.000.
Computer Election Systems: *See*—
Thayne, Stephen W., 4,504,735, Cl. 235-50.00A.
Conn, James K.; and Patel, Sharadchandra D., to Harris Corporation. Modular beam waveguide. 4,504,806, Cl. 333-241.000.
Conoco Inc.: *See*—
Anderson, Ardis L., 4,504,274, Cl. 44-6.000.
Oertle, Donald H.; and Ivie, Randall G., 4,503,710, Cl. 73-763.000.
Consolidated Papers, Inc.: *See*—
Damrau, Wayne A., 4,503,804, Cl. 118-410.000.
Conte, Alberto, to Selca S.p.A. Absolute precision transducer for linear or angular position measurements. 4,504,832, Cl. 340-870.370.
Continental Can Company, Inc.: *See*—
Khoury, Nick S., 4,504,181, Cl. 413-17.000.
Continental Group, Inc., The: *See*—
Boik, Elmer J.; and Marshall, Frederick P., 4,504,009, Cl. 229-5.500.
Continental Gummi-Werke Aktiengesellschaft: *See*—
De Vries, Gerhard, 4,504,150, Cl. 366-80.000.
Continental Packaging Company, Inc.: *See*—
Roth, Donals J.; Kubis, Charles S.; and Walter, John, 4,503,990, Cl. 220-276.000.
Contraves GmbH: *See*—
Prohl, Hans-Rudiger; Schmidt, Bernd; and Spannehl, Hans-Peter, 4,504,843, Cl. 346-138.000.
Conway, Larry J.; Tucker, Trevor W.; and Bouchard, Sylvain L., to Canada, Her Majesty the Queen in right of, as represented by Minister of National Defence of Her Majesty's Canadian Government. Sampling frequency converter. 4,504,791, Cl. 328-15.000.
Conway, Larry J.: *See*—
Tucker, Trevor W.; and Conway, Larry J., 4,504,785, Cl. 324-77.00H.
Cook, Albert N., to Singer Company, The. Pivotable motor with mounting pin. 4,503,792, Cl. 112-220.000.
Cook, Peter W.; Hsieh, Hung-Hui; and Miranker, Glen S., to International Business Machines Corporation. Carry lookahead logical mechanism using affirmatively referenced transfer gates. 4,504,924, Cl. 364-787.000.
Cook, Stuart A.: *See*—
Dyson, Lewis R.; Young, Dan B.; and Cook, Stuart A., 4,504,241, Cl. 446-304.000.
Cooper, Barry A., to Bemis Company, Inc. Process and polymer blend composition for stretch wrap film. 4,504,434, Cl. 264-22.000.
Cooper, David L.: *See*—
Duncan, Garland H., III; and Cooper, David L., 4,503,668, Cl. 60-39.320.
Cooper, Stephen M., to General Electric Company. Copolyetherimides and process of preparation. 4,504,650, Cl. 528-185.000.
Corbett, Constance R.: *See*—
Aliberto, Ellen S.; Corbett, Constance R.; and McIntyre, Randall S., 4,504,510, Cl. 426-553.000.
Cordier, Rose: *See*—
Jarret, Bertrand; Cordier, Rose; and Buffa, Gerard, 4,504,975, Cl. 455-608.000.
Cornell, William D.; and Evans, Carnot, to Sherwood Medical Company. Lancet injector. 4,503,856, Cl. 128-314.000.
Cornils, Boy: *See*—
Gartner, Roderich; Cornils, Boy; Bexten, Ludger; and Kupies, Dieter, 4,504,588, Cl. 502-24.000.
Coronado, Rodolfo A. Drafting tool support apparatus. 4,503,981, Cl. 211-69.500.
Corsette, Douglas F. Dispensing pump adapted for pressure filling. 4,503,997, Cl. 222-321.000.
Cosentino, Edward. Method and apparatus for laying tile. 4,503,654, Cl. 52-747.000.
Coton, William H.: *See*—
Askam, John F.; and Coton, William H., 4,504,337, Cl. 156-64.000.
Cottet Freres: *See*—
Cottet, Jackie, 4,504,127, Cl. 351-86.000.
Cottet, Jackie, to Cottet Freres. Frame front for eyeglasses permitting interchangeability of lenses. 4,504,127, Cl. 351-86.000.
Coulter Systems Corporation: *See*—
Kuehnle, Manfred R.; Matkan, Josef; and Fraser, Kenneth D., 4,504,138, Cl. 355-10.000.
Thomas, E. Raymond; Cahill, Lysle D.; Tibbits, John L.; Fraser, Kenneth D.; Keane, John F.; Harting, Stanley C.; Kramer, George H.; Duke, Ronald J.; Kessis, Theodore A.; Butler, John C.; Frank, Gary L.; and Lawson, John A., 4,504,126, Cl. 350-469.000.
Couper, Robert A.; Lillie, Terrance L.; and Sera, Kiyoshi, to Pitney Bowes Inc. External attribute logic for use in a word processing system. 4,504,828, Cl. 340-735.000.
Courtney, Thomas F., Jr.: *See*—
Pittet, Alan O.; Courtney, Thomas F., Jr.; and Muralidhara, Ranya, 4,504,508, Cl. 426-535.000.
Coutu, Walter H., Sr. Roof construction. 4,503,644, Cl. 52-13.000.
Cowdery, James R.: *See*—
Khoylian, Rouzas R.; Cowdery, James R.; and Park, David B., 4,503,968, Cl. 198-472.000.
Cowell, Thomas H.: *See*—
Jahr, Ronald S.; and Cowell, Thomas H., 4,504,831, Cl. 340-870.030.
Cox, Norman V. Printing machine doctor blades. 4,503,770, Cl. 101-169.000.
Cox, Samson A.; Bennett, Edgar F.; and Yule, Thomas J., to United States of America, Energy. Tritium monitor with improved gamma-ray discrimination. 4,504,737, Cl. 250-435.000.
Coyte, Raymond G., to Molins PLC. Cigarette manufacture. 4,503,868, Cl. 131-282.000.
CPG Products Corp.: *See*—
Dyson, Lewis R.; Young, Dan B.; and Cook, Stuart A., 4,504,241, Cl. 446-304.000.
Crabtree, Austin; Crabtree, James R.; and Crabtree, Jeffrey. Chill temperature meter. 4,504,157, Cl. 374-109.000.
Crabtree, James R.: *See*—
Crabtree, Austin; Crabtree, James R.; and Crabtree, Jeffrey, 4,504,157, Cl. 374-109.000.
Crabtree, Jeffrey: *See*—
Crabtree, Austin; Crabtree, James R.; and Crabtree, Jeffrey, 4,504,157, Cl. 374-109.000.
Crain, Philip W.; and St. Pierre, Raymond M., to Mattel, Inc. Modular unit with toy vehicle propulsion device. 4,504,242, Cl. 446-429.000.
Crain, Ronald A.: *See*—
Toldi, George; Nigam, Anil; and Crain, Ronald A., 4,504,879, Cl. 360-105.000.
Crano, John C.: *See*—
Krass, Dennis K.; Crano, John C.; and Newman, Melvin S., 4,504,671, Cl. 560-21.000.
Creasey, Jack R.: *See*—
Pilkington, Mervin V.; Creasey, Jack R.; and Becken, Richard H., 4,504,604, Cl. 523-167.000.
Crichlow, Charles A.: *See*—
Martin, Lawrence L.; Worm, Manfred; and Crichlow, Charles A., 4,504,680, Cl. 564-265.000.
Cross, David C.: *See*—
Howard, Dean D.; and Cross, David C., 4,504,835, Cl. 343-755.000.
Crumb, Donald A.; and Zander, Richard A., to Allied Corporation. Master cylinder. 4,503,677, Cl. 60-562.000.
Crutchfield, Mark K.: *See*—
Beam, Clark W.; and Crutchfield, Mark K., 4,504,037, Cl. 251-1.00A.
CSELT - Centro Studi e Laboratori Telecomunicazioni S.P.A.: *See*—
Tamburelli, Giovanni, 4,504,958, Cl. 375-12.000.
Cuevas, James W. Recoil reducing mechanism for shotguns. 4,503,632, Cl. 42-1.00V.
Curchod, Anne: *See*—
Schneiter, Ali; Fluckiger, Jean-Frederic; and Curchod, Anne, 4,504,703, Cl. 179-102.000.
Currie, Thomas P.; and Zbinden, Terry B., to Sperry Corporation. Cooling system monitor assembly and method. 4,504,156, Cl. 374-45.000.
Cvenglos, Jan: *See*—
Tkac, Alexander; and Cvenglos, Jan, 4,504,361, Cl. 202-172.000.
Cygan, Lawrence F.; Olivera, Raul; and Pottle, John F., to Motorola Inc. Gounding and positioning clip for a power transistor. 4,504,886, Cl. 361-386.000.
Cyrus, Jack D.; Kadlec, Emil G.; and Klimas, Paul C., to United States of America, Energy. Jet spoiler arrangement for wind turbine. 4,504,192, Cl. 416-41.000.
D & W Industries, Inc.: *See*—
Leuning, Wilfred D., 4,504,014, Cl. 239-433.000.

Dacam Corporation: *See*—
Osteen, John F., 4,503,657, Cl. 53-48.000.
Dahlin, Ebbe T. Tool for use when fitting window frames, door frames and like structures. 4,503,897, Cl. 145-1.00R.
Dai Nippon Insatsu K.K.: *See*—
Horiguchi, Satoru, 4,504,961, Cl. 377-8.000.
Daicel Chemical Industries, Ltd.: *See*—
Omiya, Takeo, 4,504,656, Cl. 536-66.000.
Yamazaki, Kazuhiro; and Miwa, Takamichi, 4,504,355, Cl. 159-3.000.
Daikin Kogyo Co., Ltd.: *See*—
Maetani, Teruo; Miyoshi, Ryoichi; Nahara, Yukinori; Kawazoe, Yasuyuki; and Hamada, Taizo, 4,504,228, Cl. 433-199.000.
Ohmori, Akira; and Tomihashi, Nobuyuki, 4,504,642, Cl. 526-246.000.
Takamatsu, Shuichi, 4,504,686, Cl. 568-684.000.
Daimler-Benz Aktiengesellschaft: *See*—
Acker, Bernd, 4,503,734, Cl. 74-866.000.
Andres, Rudolf; Grantz, Helmut; Munzel, Wolf-Dietrich; and Odebrecht, Wolfgang, 4,503,906, Cl. 165-104.210.
Burckhardt, Manfred; and Schulte, Herbert, 4,503,944, Cl. 188-71.600.
Dainippon Ink and Chemicals, Inc.: *See*—
Takenouchi, Osamu; Nguyen Chanh, Khe; Kawara, Tatsuo; and Tanaka, Hisami, 4,504,560, Cl. 430-72.000.
Dal Pan, Giacinto; and Gnecchi, Edgardo, to Innse Innocente Santeustacchio S.p.A. Apparatus for supporting the piercing mandrel backup bar of a press-piercing rolling mill. 4,503,698, Cl. 72-209.000.
Damrau, Wayne A., to Consolidated Papers, Inc. Edge seal assembly for paper coating apparatus. 4,503,804, Cl. 118-410.000.
Dana Corporation: *See*—
Flotow, Richard A.; Rathburn, Jerry L.; and Schlosser, DeWayne F., 4,503,959, Cl. 192-70.300.
Danen, John A.: *See*—
Bandy, Peter B.; Danen, John A.; Heise, Nyles N.; and Holtan, Donald C., 4,504,873, Cl. 360-63.000.
Daniel, Daniel S.: *See*—
Delton, Mary H.; and Daniel, Daniel S., 4,504,368, Cl. 204-1.00T.
Daniels, Edward P.; and Dlugos, Daniel F., to Pitney Bowes Inc. Method and apparatus for individualized postage value computing. 4,504,915, Cl. 364-466.000.
Danielson, Robert L.; Bosco, Peter M.; and Steensen, Wayne L., to Nabisco Brands, Inc. Pudding mix composition. 4,504,512, Cl. 426-579.000.
Daubendiek, Richard L.: *See*—
Evans, Francis J.; Daubendiek, Richard L.; and Raleigh, Ronald G., 4,504,570, Cl. 430-217.000.
Daugherty, Donald L., to Bunn-O-Matic Corporation. Beverage brewing apparatus. 4,503,757, Cl. 99-281.000.
Davidson, Donald J.; and Sheill, David D., to Rockwell International Corporation. Braking piston for a disc brake. 4,503,946, Cl. 188-71.900.
Davies, Bryan T., to Chevron Research Company. Method and apparatus for controlling a rotating biological contactor. 4,504,393, Cl. 210-614.000.
Davies, Gareth M.: *See*—
Jung, Frederic H.; and Davies, Gareth M., 4,504,478, Cl. 514-202.000.
Davies, Neil A.; and Hughes, Edward T. E., to U.S. Philips Corporation. Semiconductor devices and a solder for use in such devices. 4,504,849, Cl. 357-67.000.
Davies, Robert B.; Miller, Ira; and Dotson, Robert N., to Motorola, Inc. Current ramp generator. 4,504,928, Cl. 365-11.000.
Davis, Clifford, to Jasper, Edward D.; and Bohm, Rolland. Muzzle loading firearm. 4,503,633, Cl. 42-51.000.
Davis, John L.: *See*—
Fowler, James C.; Wheatley, Howard S.; and Davis, John L., 4,504,833, Cl. 343-5.0NA.
Davis, Raymond E. Safety guard equipped cardboard box cutter. 4,503,612, Cl. 30-2.000.
Davis, Royston H., to Shell Oil Company. Pesticidal vinyl-tin compounds. 4,504,488, Cl. 514-493.000.
Davis, Royston H.; Schroeder, Mark E.; and Mitchell, Terence N., to Shell Oil Company. Use of certain vinyl-tin compounds as insecticides. 4,504,489, Cl. 514-493.000.
Davis, Ruth A.; Herron, Donn M.; Pervier, James W.; and Vines, Harvey L., to Air Products and Chemicals, Inc. Nitrogen rejection from natural gas integrated with NGL recovery. 4,504,295, Cl. 62-30.000.
Dawson, Dennis E. Towable transport carrier for motorcycles and the like. 4,504,075, Cl. 280-402.000.
Dawson, Patricia S., to Spit Pit, Inc. Disposable receptacle for spittle. 4,503,572, Cl. 4-258.000.
Dayco Corporation: *See*—
Foster, Randy C., 4,504,254, Cl. 474-133.000.
Marsh, Richard L.; and Wetzel, Robert E., 4,504,342, Cl. 156-138.000.
Deakin University: *See*—
Bond, Alan M.; Hudson, Henry A.; van den Bosch, Pierre A.; and Walter, Frederick L., 4,504,367, Cl. 204-1.00T.
Dean, Barry D., to Atlantic Richfield Company. Methylmethacrylate/N-phenylmaleimide copolymer-containing polymer alloys. 4,504,627, Cl. 525-205.000.
Deaton, John G.: *See*—
Smith, Harry D., Jr.; Small, Tony M.; and Deaton, John G., 4,504,736, Cl. 250-256.000.
Debono, Manuel: *See*—
Molloy, R. Michael; and Debono, Manuel, 4,504,467, Cl. 424-118.000.
Dec International, Inc.: *See*—
Quee, Jack A.; and Haak, Mark P., 4,504,451, Cl. 423-242.000.
Decker, Stephen K.: *See*—
Church, Mark A.; and Decker, Stephen K., 4,504,880, Cl. 360-113.000.
deCourcy, David R.: *See*—
Barker, Sidney A.; Baggett, Neil; Stevenson, John; and deCourcy, David R., 4,504,314, Cl. 106-38.350.
Deere & Company: *See*—
Bedney, Harris I., 4,504,076, Cl. 280-411.00A.
Wiegardt, Gordon K., 4,503,916, Cl. 172-3.000.
Degenhardt, Charles R.: *See*—
Van Duzee, Barry F.; and Degenhardt, Charles R., 4,504,462, Cl. 424-1.100.
DeHilster, Robert J.: *See*—
Aro, Enn; DeHilster, Robert J.; and Bogan, Leonard E., 4,504,942, Cl. 370-58.000.
Delachaux, C.: *See*—
Boulier, Laurent L., 4,504,310, Cl. 75-27.000.
Delalande S.A.: *See*—
Moinet, Gerard H.; Dostert, Philippe L.; and Bourgery, Guy R., 4,504,663, Cl. 546-144.000.
della Porta, Paolo, to SAES Getters SpA. Support tab for getter devices. 4,504,765, Cl. 313-481.000.
Delta Central Refining, Inc.: *See*—
O'Blasny, Richard H., 4,504,383, Cl. 208-179.000.
Delta Screw Nederland B.V.: *See*—
Bloemendal, Berend J.; and Grootte Bromhaar, Marinus J., 4,504,203, Cl. 418-201.000.
Delton, Mary H.; and Daniel, Daniel S., to Eastman Kodak Company. Alkali metal ion-selective compositions and elements and a method of using same. 4,504,368, Cl. 204-1.00T.
Demopoulos, Dino M., to Murray Machinery, Inc. Disc type wood chipper knife having positioning serrations and intermediate land therebetween. 4,503,893, Cl. 144-176.000.
Denamps, Jean: *See*—
Burkel, Rainer; Bayle, Rene ; Denamps, Jean; and Goussin, Roger, 4,504,770, Cl. 318-560.000.
Deneke, Klaus: *See*—
Allemann, Kurt; Deneke, Klaus; Hass, Hansjurgen; and Vogel, Gunter, 4,504,315, Cl. 106-89.000.
Denki Kagaku Kogyo Kabushiki Kaisha: *See*—
Kitsunai, Tomoyuki; Saito, Kiyotaka; and Hori, Shozo, 4,504,625, Cl. 525-71.000.
Dentsply Research & Development Corp.: *See*—
Koblitz, Francis F.; and Reichart, Jane L., 4,504,231, Cl. 433-228.000.
de Pover, Alain: *See*—
Schwartz, Arnold; Grupp, Ingrid L.; Grupp, Gunter; and de Pover, Alain, 4,504,476, Cl. 514-211.000.
Des-Case Corporation: *See*—
Waller, James E., 4,504,289, Cl. 55-316.000.
Desbos, Gilbert; and Faivre, Michel, to OTV (Omnium de Traitement et de Valorisation). Reactor for injection of gas into a liquid. 4,504,388, Cl. 210-150.000.
Desmond, Michael J.; and Pepera, Marc A., to Standard Oil Company, The. Catalysts and their preparation. 4,504,590, Cl. 502-73.000.
DeSoto, Inc.: *See*—
Lewarchik, Ronald J.; Murphy, Edward J.; and Beeks, Elaine C., 4,504,374, Cl. 204-181.00C.
Deutsch, Reinhard: *See*—
Erdmann, Otto; and Deutsch, Reinhard, 4,503,967, Cl. 198-419.000.
Devine, Thomas H. Universal stern tube and propeller shaft sealing apparatus. 4,504,065, Cl. 277-12.000.
deVos, Jacobus A.: *See*—
Faber, Johannes W.; and deVos, Jacobus A., 4,504,936, Cl. 369-34.000.
Devrient, Ludwig; and Gauch, Wolfgang, to GAO Gesellschaft fur Automation und Organisation mbH. Guilloche identification card. 4,504,083, Cl. 283-77.000.
De Vries, Gerhard, to Continental Gummi-Werke Aktiengesellschaft. Extruder. 4,504,150, Cl. 366-80.000.
Dexter, Martin; and Winter, Roland A. E., to Ciba-Geigy Corporation. Alpha-cyanocinnamate ultraviolet-absorbing stabilizers substituted by an aliphatic hydroxyl group. 4,504,419, Cl. 260-465.00D.
DeZubay, Egon A.: *See*—
Spurrier, Francis R.; DeZubay, Egon A.; Murray, Alexander P.; and Vidt, Edward J., 4,504,447, Cl. 422-204.000.
Dhillon, Major S., to American Hoechst Corporation. Cleansing agent for printing plates. 4,504,406, Cl. 252-143.000.
Diamond, Edward P.: *See*—
McClelland, John R.; Wright, Wade S.; Diamond, Edward P.; Pryor, Leroy C.; and Olson, Douglas R., 4,504,957, Cl. 373-130.000.
Diamond Shamrock Chemicals Company: *See*—
Lipowski, Stanley A., 4,504,316, Cl. 106-90.000.
Diaz, Mario J.: *See*—
Farris, Richard C.; and Diaz, Mario J., 4,503,929, Cl. 181-118.000.
DiCarlo, Leonard J.; Ares, Roland A.; and Norton, Robert O., to Hussmann Corporation. Oil control valve for refrigeration system. 4,503,685, Cl. 62-193.000.

Dickman, Lloyd I., to Digital Equipment Corporation. Central processor with means for suspending instruction operations. 4,504,903, Cl. 364-200.000.
Diehl GmbH & Co.: *See*—
Nussbaum, Helmut; and Weber, Adolf, 4,503,776, Cl. 102-496.000.
Dierks & Sohne GmbH & Co. KG: *See*—
Moller, Dieter; and Boert, Konrad, 4,504,152, Cl. 366-188.000.
Dieter Graesslin Feinwerktechnik: *See*—
Kammerer, Gerd, 4,504,154, Cl. 368-74.000.
Dietrich, Ronald J.: *See*—
Klar, Erhard; Hashiguchi, Don H.; and Dietrich, Ronald J., 4,504,597, Cl. 502-225.000.
Diggins, Joseph P., to Foster Wheeler Energy Corporation. Particle classifier apparatus and method with rudder control vane. 4,504,018, Cl. 241-53.000.
DiGiovanni, Donald. Threaded fastener removing tool. 4,503,737, Cl. 81-436.000.
Digital Equipment Corporation: *See*—
Dickman, Lloyd I., 4,504,903, Cl. 364-200.000.
DiSalvo, Anthony L.; and Tsai, Chung-Chieh, to Stauffer Chemical Company. Modified poly(oxazolidone/urethane) compositions. 4,504,633, Cl. 525-438.000.
Discovision Associates: *See*—
Eberly, Carlyle J., 4,504,939, Cl. 369-46.000.
Disko, Harry: *See*—
Kulesza, Ralph J.; Disko, Harry; and Gibbons, Dennis R., 4,504,239, Cl. 446-95.000.
Dlugos, Daniel F.: *See*—
Daniels, Edward P.; and Dlugos, Daniel F., 4,504,915, Cl. 364-466.000.
Dnepropetrovsky Inzhenerno-Stroitelny Institut: *See*—
Feklin, Valentin I., 4,504,173, Cl. 405-240.000.
Dr. Ing. h.c.F. Porsche A.G.: *See*—
Mittermeier, Walter, 4,504,251, Cl. 474-110.000.
von Sivers, Rolf, 4,503,926, Cl. 180-75.200.
Doerges, Alexander; Schlauer, Johann; Kriebel, Manfred; and Hude, Anton, to Metallgesellschaft Aktiengesellschaft. Process of regenerating absorbent solutions for sulfur-containing gases. 4,504,449, Cl. 423-228.000.
Doi, Hideaki; Kokubun, Kenichi; Sakagami, Teruo; and Murayama, Naohiro, to Kureha Kagaku Kogyo Kabushiki Kaisha. Photoresist material. 4,504,631, Cl. 525-327.300.
Dolejs, Anthony H.: *See*—
Murck, Sanford C.; and Dolejs, Anthony H., 4,504,052, Cl. 271-9.000.
Donaldson Company, Inc.: *See*—
Gillingham, Gary R.; Wahlquist, Fred H.; and Matthys, Bernard A., 4,504,293, Cl. 55-350.000.
Dones, Roberto; and Street, David G., to Raychem Pontoise S.A. Sealable recoverable articles. 4,504,699, Cl. 174-84.00R.
Donnelly, James; and Ives, Milton N., to Carlingswitch, Inc. Plunger switch with pivoted actuator. 4,504,712, Cl. 200-159.00R.
Dornbusch, Arthur H.: *See*—
Nixdorff, Frank S.; and Dornbusch, Arthur H., 4,503,986, Cl. 215-252.000.
Dostert, Philippe L.: *See*—
Moinet, Gerard H.; Dostert, Philippe L.; and Bourgery, Guy R., 4,504,663, Cl. 546-144.000.
Dotson, Robert N.: *See*—
Davies, Robert B.; Miller, Ira; and Dotson, Robert N., 4,504,928, Cl. 365-11.000.
Dotter, Charles T. Transluminally placed expandable graft prosthesis. 4,503,569, Cl. 3-1.400.
Dougherty, Joseph P., to EMCEE A Division of Electronics, Missiles & Communications, Inc. Portable TV transmitter. 4,504,861, Cl. 358-143.000.
Dow Chemical Company, The: *See*—
Johnson, Mark R., 4,504,628, Cl. 525-278.000.
Willard, Ralph O., 4,504,400, Cl. 252-8.55R.
Dow Corning Corporation: *See*—
Lefler, Harold V., III, 4,504,621, Cl. 524-783.000.
Doyel, John S. Sewing box. 4,504,000, Cl. 223-107.000.
Doyle, Stephen D.: *See*—
Bulso, Joseph D., Jr.; and Doyle, Stephen D., 4,503,702, Cl. 72-349.000.
Dragerwerk Aktiengesellschaft: *See*—
Pasternak, Adalbert, 4,503,850, Cl. 128-201.250.
Drenkelfort, Hans, to Honeywell-Elac-Nautik GmbH. Echo-sounding apparatus. 4,504,931, Cl. 367-115.000.
Drouin, Bernard: *See*—
Lucas, Jean; Goupillon, Jean-Francois; and Drouin, Bernard, 4,503,767, Cl. 100-214.000.
Drummond, Richard S. Two wheeled utility cart. 4,504,071, Cl. 280-5.240.
Dubos, Jacques: *See*—
Gauthier, Francis; and Dubos, Jacques, 4,504,300, Cl. 65-10.100.
Ducret, Robert P., to Beehler, Pavitt, Siegemund, Jagger & Martella. Method and apparatus for video standard conversion. 4,504,852, Cl. 358-11.000.
Dudley, Darnell T.; and Luhrs, Herman F., to Dynamic Technological Developments, Inc. Process and apparatus for effecting carburetion. 4,504,425, Cl. 261-50.00A.
Dueber, Thomas E., to Du Pont de Nemours, E. I., and Company. Single exposure positive contact multilayer photosolubilizable litho element with two quinone diazide layers. 4,504,566, Cl. 430-156.000.
Duffy, James J.: *See*—
Ilardo, Charles S.; and Duffy, James J., 4,504,611, Cl. 524-101.000.
Duffy, John P., to Polysar Limited. Polymer recovery. 4,504,654, Cl. 528-499.000.
Duke, June T.; Mazeke, Herbert F.; and Prem, Dorothy C., to Standard Oil Company, The. Film-forming olefinic nitrile polymer latex and method of preparing same. 4,504,605, Cl. 523-201.000.
Duke, Ronald J.: *See*—
Thomas, E. Raymond; Cahill, Lysle D.; Tibbits, John L.; Fraser, Kenneth D.; Keane, John F.; Harting, Stanley C.; Kramer, George H.; Duke, Ronald J.; Kessis, Theodore A.; Butler, John C.; Frank, Gary L.; and Lawson, John A., 4,504,126, Cl. 350-469.000.
Duke University: *See*—
Osborne, Dennis R. S., 4,504,050, Cl. 269-328.000.
Dulux Australia Ltd.: *See*—
Irvine, Antony J.; Leary, Bruce; and Such, Christopher H., 4,504,618, Cl. 524-457.000.
Dumas, Richard H.: *See*—
Katz, Lawrence E.; and Dumas, Richard H., 4,504,667, Cl. 546-345.000.
Duncan, Garland H., III; and Cooper, David L., to United States of America, Air Force. Strutless diffuser for gas turbine engine. 4,503,668, Cl. 60-39.320.
Dunlop Limited: *See*—
Askam, John F.; and Coton, William H., 4,504,337, Cl. 156-64.000.
Haines, Robert C.; and Pridgeon, Royce, 4,504,345, Cl. 156-213.000.
Dunstan, Phillip E. Water preheater system. 4,503,839, Cl. 126-437.000.
Du Pont de Nemours, E. I., and Company: *See*—
Booker, Reginald A., 4,504,578, Cl. 430-621.000.
Cluff, Stephen L.; and Strolle, Clifford H., 4,504,620, Cl. 524-602.000.
Dueber, Thomas E., 4,504,566, Cl. 430-156.000.
Ketterer, Charles C., 4,504,612, Cl. 524-101.000.
Lee, Ross A., 4,504,575, Cl. 430-531.000.
McKinney, Ronald J., 4,504,674, Cl. 560-202.000.
Riggs, Dennis M., 4,504,454, Cl. 423-447.100.
Durand, Alain J. Device for catheterization in particular for perfusions in the medical and veterinary fields. 4,504,269, Cl. 604-272.000.
Duwel, Dieter: *See*—
Rosner, Manfred; Urbanietz, Josef; Loewe, Heinz; Duwel, Dieter; and Kirsch, Reinhard, 4,504,490, Cl. 514-483.000.
Dynamic Technological Developments, Inc.: *See*—
Dudley, Darnell T.; and Luhrs, Herman F., 4,504,425, Cl. 261-50.00A.
Dynamit Nobel AG: *See*—
Allemann, Kurt; Deneke, Klaus; Hass, Hansjurgen; and Vogel, Gunter, 4,504,315, Cl. 106-89.000.
Dynamit Nobel Aktiengesellschaft: *See*—
Titz, Siegfried; Langel, Matthias; Wissinger, Waldemar; and Kurth, Josef, 4,504,210, Cl. 425-461.000.
Dyren, Karl E. A.; and Strandberg, Gustaf S., to KMW Aktiebolag. Screening apparatus for wood chips. 4,504,386, Cl. 209-254.000.
Dyson, Lewis R.; Young, Dan B.; and Cook, Stuart A., to CPG Products Corp. Toy figure with manually operable ingestion system. 4,504,241, Cl. 446-304.000.
Eagleair, Inc.: *See*—
Hagar, Donald K.; and Geiger, Lyle D., 4,504,216, Cl. 431-183.000.
Earl, Gary W.; and Hickman, Howard M., to Sherex Chemical Company, Inc. High yield preparation of aromatic amine oxides. 4,504,666, Cl. 546-345.000.
Earle, Roland D.; and McKee, Donald H. Coated food product and method of making same. 4,504,502, Cl. 426-293.000.
Early, Susan E. Automatic floor treating apparatus. 4,503,581, Cl. 15-319.000.
Easter, Finis C.; and Aires, Ramon H., to RCA Corporation. Switching dc-to-dc converters. 4,504,896, Cl. 363-21.000.
Eastman Kodak Company: *See*—
Abel, Edward P.; and Bowman, Wayne A., 4,504,569, Cl. 430-214.000.
Clark, Bernard A.; Simons, Michael J.; and Holstead, Colin, 4,504,568, Cl. 430-203.000.
Delton, Mary H.; and Daniel, Daniel S., 4,504,368, Cl. 204-1.00T.
Evans, Francis J.; Daubendiek, Richard L.; and Raleigh, Ronald G., 4,504,570, Cl. 430-217.000.
Martin, William A.; and Lee, James K., 4,504,132, Cl. 354-195.100.
Eatock, Fred L., to Hewlett-Packard Company. Preamplifier circuits. 4,504,797, Cl. 330-293.000.
Eaton Corporation: *See*—
Cartz, Louis; Weiss, Arnold; Schutten, Herman P.; Spellman, Gordon B.; Jaskolski, Stanley V.; and Wackman, Peter H., deceased, 4,504,964, Cl. 378-119.000.
Green, Edward A., 4,503,726, Cl. 74-473.00R.
Eberhardt, H. Alfred, to Hale Fire Pump Company. Starting system for a portable engine-pump unit. 4,503,812, Cl. 123-2.000.
Eberhardt, Roland C. Plaque alignment tool. 4,503,618, Cl. 33-180.00R.
Eberly, Carlyle J., to Discovision Associates. Storage medium track pitch detector. 4,504,939, Cl. 369-46.000.
Ebersberger, Hans, to Siemens Aktiengesellschaft. Rotary anode X-ray tubes. 4,504,965, Cl. 378-132.000.
Ebi, Yutaka; Fujii, Tadashi; Sekiya, Takuro; Horike, Masanori; Furukawa, Tatsuya; and Tachiki, Masaaki, to Ricoh Company, Ltd. Ink jet printing apparatus. 4,504,844, Cl. 346-140.00R.
Ebner, Jerry R., to Monsanto Company. Producing acrylonitrile using a particular catalyst. 4,504,420, Cl. 260-465.300.

EC Erdolchemie GmbH: *See*—
Herwig, Jens; Scheef, Hans-Volker; Schleppinghoff, Bernhard; and Lange, Peter M., 4,504,688, Cl. 568-697.000.

Eda, Tadaji. Permanent hair-waving. 4,504,466, Cl. 424-72.000.

Edebo, Lars B.; Swede, Harald G.; and Tornqvist, Nils-Erik, to Assab Medicin AB. Apparatus for cleaning and disinfecting used plastic Petri dishes. 4,503,873, Cl. 134-104.000.

Edwards, Michael F.; and Mabon, John D., to GKN Sankey Limited. Welded drop-center vehicle wheels. 4,504,095, Cl. 301-63.00R.

Efner, Howard F.; and Schiff, Sidney, to Phillips Petroleum Company. Fuel additives from SO_2 treated mixtures of amides and esters derived from vegetable oil, tall oil acid, or aralkyl acid. 4,504,280, Cl. 44-63.000.

Eichelberger, John L.: *See*—
Chen, Johnson C. H.; and Eichelberger, John L., 4,504,402, Cl. 252-70.000.

Ekelman, Ernest P., Jr.; and Ostertag, Edward L., to Andrew Corporation. Multi-port combiner for multi-frequency microwave signals. 4,504,805, Cl. 333-126.000.

Electra Mikun (Industries) Ltd.: *See*—
Raz, Dan, 4,504,041, Cl. 254-9.00R.

Electronic Systems International, Inc.: *See*—
Evans, Wayne W., 4,504,778, Cl. 323-323.000.

Elfab Corporation: *See*—
Evans, Evan, 4,503,608, Cl. 29-839.000.

Eli Lilly and Company: *See*—
Molloy, R. Michael; and Debono, Manuel, 4,504,467, Cl. 424-118.000.

Elliott, Michael; Janes, Norman F.; and Khambay, Bhypinder P. S., to National Research Development Corporation. Pesticides. 4,504,491, Cl. 514-521.000.

Elliott, Richard I.: *See*—
Papalexis, Gregory C.; and Elliott, Richard I., 4,503,966, Cl. 198-382.000.

Ellman, Alan G.: *See*—
Garito, Jon C.; and Ellman, Alan G., 4,504,229, Cl. 433-215.000.

Elmefjall, Bernt C. G.: *See*—
Lindberg, Bertil J.; and Elmefjall, Bernt C. G., 4,504,176, Cl. 405-271.000.

Elmis, Herbert; and Novotny, Bernd, to ITT Industries, Inc. Digital frequency/phase locked loop. 4,504,799, Cl. 331-1.00A.

Elsmore, Jeffrey C.: *See*—
Schollmeyer, Thomas A.; and Elsmore, Jeffrey C., 4,504,153, Cl. 368-10.000.

Elter, Claus; Schneider, Karl U.; Schoning, Josef; Stach, Heinrich; and Stracke, Wilfried, to Hochtemperatur-Reaktorbau GmbH. Gas cooled nuclear reactor. 4,504,439, Cl. 376-391.000.

Elvey, Dwight: *See*—
Zasio, John; Elvey, Dwight; and Tanizawa, Ronald, 4,504,783, Cl. 324-73.00R.

EMCEE A Division of Electronics, Missiles & Communications, Inc.: *See*—
Dougherty, Joseph P., 4,504,861, Cl. 358-143.000.

Emerson Electric Co.: *See*—
Bryant, Jimmy R.; Mertens, Waldemar W.; and Kenny, Frances A., 4,504,710, Cl. 200-80.00R.

EMI Limited: *See*—
Moore, John F., 4,504,962, Cl. 378-19.000.

Enami, Ken: *See*—
Wada, Kinzo; and Enami, Ken, 4,504,881, Cl. 361-23.000.

Encon Products, Inc.: *See*—
Simpson, Harold G., 4,503,653, Cl. 52-664.000.

Enei, Hitoshi: *See*—
Kurahashi, Osamu; Tsuchida, Takayasu; Kawashima, Hiroki; Enei, Hitoshi; and Nakamori, Shigeru, 4,504,581, Cl. 435-107.000.

Energy Conversion Devices, Inc.: *See*—
Ovshinsky, Stanford R.; Allred, David D.; Walter, Lee; and Hudgens, Stephen J., 4,504,518, Cl. 427-38.000.

Energy Fibers Int'l. Corp.: *See*—
Monaghan, George J., 4,504,544, Cl. 428-357.000.

Engelhardt, Hans: *See*—
Hacker, Harald; Amann, Ulrich; Geisinger, Karl; and Engelhardt, Hans, 4,503,766, Cl. 100-207.000.

Engelke, Helmut: *See*—
Bohlen, Harald; Engelke, Helmut; Greschner, Johann; and Nehmiz, Peter, 4,504,558, Cl. 430-30.000.

Engelking, Uwe, to Agence Spatiale Europeenne. Stabilizing device for gyroscope effect apparatus such as a space craft or vehicle, especially with a view to damping the nutation motion. 4,504,033, Cl. 244-170.000.

Englander, Hank E., to Chevron Research Company. Apparatus for diluting highly concentrated solutions. 4,504,444, Cl. 422-100.000.

Enomoto, Seiji: *See*—
Takemae, Yoshihiro; Ohira, Tsuyoshi; and Enomoto, Seiji, 4,504,929, Cl. 365-210.000.

Entrekin, Robert R., to Biomedics, Inc. Fetal heartbeat doppler transducer. 4,503,861, Cl. 128-661.000.

Entreprise Hartmann Pere et Fils: *See*—
Hartmann, Michel, 4,504,221, Cl. 432-137.000.

Erdmann, Otto; and Deutsch, Reinhard, to Hauni-Werke Korber & Co. KG. Apparatus for accumulating arrays of cigarettes or the like. 4,503,967, Cl. 198-419.000.

Erickmann, Karl. Fluid motor driven multi propeller aircraft. 4,504,029, Cl. 244-54.000.

Eriksen, Gunnar, to Thune-Eureka A/S. Assembly for treatment of an endless wire or felt. 4,504,359, Cl. 162-274.000.

Ernst Leitz Wetzlar GmbH: *See*—
Schlapp, Werner; and Wiessner, Werner, 4,504,134, Cl. 354-272.000.

Erstfeld, Thomas E.: *See*—
Quinlan, Kenneth P.; and Erstfeld, Thomas E., 4,504,329, Cl. 148-175.000.

ESB Elektrostatische Spruh- und Beschichtungsanlagen G.F. Vohringer GmbH: *See*—
Vohringer, Gerhard F., 4,504,292, Cl. 55-325.000.

Esho, Sotaro; Itoh, Masaki; and Matsuoka, Masaru, to NEC Corporation. Optical information recording medium for semiconductor laser. 4,504,548, Cl. 428-426.000.

Etablissements Le Simplex: *See*—
Juy, Henri, 4,504,250, Cl. 474-80.000.

Estel Hoogovens B.V.: *See*—
Smit, Arie; and Marcus, Johannes W., 4,503,978, Cl. 211-13.000.

Estreicher, Herbert; and Payne, George B., to Shell Oil Company. 6-Oxabicyclo(3.2.2.)nonan-4-ol ether herbicides. 4,504,304, Cl. 71-88.000.

Evans, Carnot: *See*—
Cornell, William D.; and Evans, Carnot, 4,503,856, Cl. 128-314.000.

Evans, Evan, to Elfab Corporation. Card edge connector tool and a method of joining a card edge connector. 4,503,608, Cl. 29-839.000.

Evans, Francis J.; Daubendiek, Richard L.; and Raleigh, Ronald G., to Eastman Kodak Company. Direct reversal emulsions and photographic elements useful in image transfer film units. 4,504,570, Cl. 430-217.000.

Evans, Jeffrey L., to Ting Enterprises, Inc. Fireplace and stove apparatus. 4,503,836, Cl. 126-135.000.

Evans, Julie F.; Findlay, Hugh T.; Popyach, Stephen A.; and Tao, Deh C., to International Business Machines Corporation. Thermal printing with ink replenishment. 4,504,840, Cl. 346-76.0PH.

Evans, Wayne W., to Electronic Systems International, Inc. Self-powered, self-regulated, electronic ac control system. 4,504,778, Cl. 323-323.000.

Everatt, Allan E.: *See*—
Chuang, Karl T.; and Everatt, Allan E., 4,504,426, Cl. 261-114.00R.

Everest and Jennings Canadian Limited: *See*—
Burrows, Donald L., 4,504,094, Cl. 301-6.00R.

Evers, William J.; Stork, Gilbert; Mookherjee, Braja D.; and Heinsohn, Howard H., Jr., to International Flavors & Fragrances Inc. Process for augmenting or enhancing the aroma of perfumed articles by adding thereto triconjugated dienones. 4,504,398, Cl. 252-8.600.

EVG Entwicklungs- und Verwertungs-Gesellschaft m.b.H.: *See*—
Schmidt, Gerhard; Ritter, Gerhard; and Ritter, Klaus, 4,503,650, Cl. 52-660.000.

Ewing, John R.: *See*—
Newell, Alton S.; Newell, Alton S., Jr.; Popovich, Paul D.; and Ewing, John R., 4,504,019, Cl. 241-73.000.

Exxon Research and Engineering Co.: *See*—
Bertsch, Carl F., 4,504,381, Cl. 208-113.000.
Pine, Lloyd A., 4,504,382, Cl. 208-114.000.
Stuntz, Gordon F.; and Schucker, Robert C., 4,504,379, Cl. 208-113.000.
Stuntz, Gordon F.; and Reid, Terry A., 4,504,380, Cl. 208-113.000.
Wright, Franklin J.; Richard, Michael A.; and Pirkle, James C., 4,504,600, Cl. 518-717.000.

Faber, Johannes W.; and deVos, Jacobus A., to U.S. Philips Corporation. Modular data storage system. 4,504,936, Cl. 369-34.000.

Fabian, James L.: *See*—
Zucker, Jerry; Singletary, Michael P.; and Fabian, James L., 4,504,528, Cl. 427-389.800.

Fairchild Camera & Instrument Corporation: *See*—
Vora, Madhukar B.; and Patel, Vikram M., 4,503,598, Cl. 29-571.000.

Faivre, Michel: *See*—
Desbos, Gilbert; and Faivre, Michel, 4,504,388, Cl. 210-150.000.

Fanuc Ltd.: *See*—
Inaba, Hajimu; and Sakakibara, Shinsuke, 4,504,771, Cl. 318-561.000.
Matsuura, Hitoshi; Yamazaki, Etsuo; and Sakurai, Hiroshi, 4,504,772, Cl. 318-603.000.

Faroudja, Yves C. Enhancement of quadrature modulated chroma by luminance or chroma transitions without chroma demodulation. 4,504,853, Cl. 358-37.000.

Farr, Glyn P. R., to Lucas Industries public limited company. Control valve for vehicle hydraulic systems. 4,503,876, Cl. 137-101.000.

Farrell, Ronald A. Air conditioning system for poultry houses. 4,504,011, Cl. 237-14.000.

Farris, Richard C.; and Diaz, Mario J., to Litton Resources Systems, Inc. Sleeve valve for an air gun having a reciprocating shuttle valve. 4,503,929, Cl. 181-118.000.

Fauss, Rudolf: *See*—
Findeisen, Kurt; and Fauss, Rudolf, 4,504,673, Cl. 560-180.000.

Feagin, Roy C., to Remet Corporation. Refractory material. 4,504,591, Cl. 501-102.000.

Fechter, Max. Electrical cord securing apparatus. 4,504,106, Cl. 339-75.00P.

Federal-Mogul Corporation: *See*—
Nelligan, Jerome M.; and Heminover, Dale R., 4,503,972, Cl. 206-379.000.

Fedorovna, Chibisova N., administrator: *See*—
Motov, David L.; Tjurkina, Ljudmila P.; Godneva, Maria M.; Kolesnikova, Nina I.; Yakusheva, Galina G.; Ivanovich, Metelkin A., deceased; and Fedorovna, Chibisova N., administrator, 4,504,271, Cl. 8-94.250.

Feecon Corporation: *See—*
Gagliardo, John P.; and Pruneau, Albert J., 4,503,915, Cl. 169-15.000.
Fehlmann, Roland: *See—*
Widmer, Alois E.; and Fehlmann, Roland, 4,504,521, Cl. 427-85.000.
Feist, Wieland: *See—*
Heinze, Rudi; Roder, Rolf; and Feist, Wieland, 4,504,143, Cl. 356-5.000.
Feklin, Valentin I., to Dnepropetrovsky Inzhenerno-Stroitelny Institut. Apparatus for constructing cast in place tubular piles and method of constructing such piles by same apparatus. 4,504,173, Cl. 405-240.000.
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Foster, Randy C., to Dayco Corporation. Belt tensioner and method of making the same. 4,504,254, Cl. 474-133.000.
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Fujishita, Kazuo; Kaneko, Hideki; Ushirokajitani, Yoshiyuki; and Kanno, Tadao, to Matsushita Electric Industrial Co., Ltd. Water heater. 4,503,810, Cl. 122-13.00R.
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Gaehring, David P.; and Scanlon, John V., to Campbell Soup Company. Texture preservation for diced fresh food products using gelled polyuronic acids. 4,504,504, Cl. 426-321.000.
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Gaind, Arun K.; Kulkarni, Subhash B.; and Poponiak, Michael R., to International Business Machines Corporation. Optimum reduced pressure epitaxial growth process to prevent autodoping. 4,504,330, Cl. 148-175.000.
Galer, Richard E., to United States Gypsum Company. Method for making reinforced cement board. 4,504,335, Cl. 156-42.000.
Gall, Adam F.; and McJunkin, Howard P., Jr., to McJunkin Corporation. Method for fabricating an orifice fitting for a gas pressure differential-measuring system. 4,503,594, Cl. 29-157.00R.
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GAO Gesellschaft fuer Automation und Organisation mbH.: *See*—
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Gardner, John F.; and Showalter, Thomas W., to Xomox Corporation. Fail-safe actuator with fusible link. 4,503,675, Cl. 60-527.000.
Garito, Jon C.; and Ellman, Alan G. Dental placement devices and methods. 4,504,229, Cl. 433-215.000.
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Gaster, Laramie M.; and Orlek, Barry S., to Beecham Group p.l.c. Pentacyclic compounds. 4,504,480, Cl. 514-214.000.

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Gauthier, Francis; and Dubos, Jacques, to Thomson-CSF. Device for manufacturing an object with chiralic structure from a source of formable material. 4,504,300, Cl. 65-10.100.

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Geisinger, Karl: *See—*
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Musschoot, Albert, 4,503,783, Cl. 110-165.00R.

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Chana, Howard E.; and Stordahl, Calmer M., 4,504,247, Cl. 474-17.000.
Kessler, David R.; Beiswenger, David W.; and Makusij, Andrew J., 4,503,826, Cl. 123-470.000.
Klomp, Edward D.; and Kosek, Thomas P., 4,503,817, Cl. 123-79.00R.
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Swann, Wayne E., 4,504,582, Cl. 435-108.000.

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Girijavallabhan, Viyyoor M.: *See—*
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GKN Sankey Limited: *See—*
Edwards, Michael F.; and Mabon, John D., 4,504,095, Cl. 301-63.00R.

Glaenzer Spicer: *See—*
Orain, Michel A., 4,504,245, Cl. 464-167.000.

Glass, Max: *See—*
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O'Callaghan, Cynthia H.; Ayres, Barry E.; Livermore, David G. H.; Newall, Christopher E.; and Weir, Niall G., 4,504,477, Cl. 514-203.000.

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Goizman, Josif. Electric field change sensor employing mains wiring as the transmitting antenna. 4,504,822, Cl. 340-561.000.

Goldfarb, Adolph E. High intensity security flashlight with duffusing parabolic reflector. 4,504,889, Cl. 362-200.000.

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Goldstein, Michael L.: *See—*
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Kushima, Tadao; Gooda, Masahiro; Soga, Tasao; and Yamamoto, Toshitaka, 4,503,597, Cl. 29-569.00R.

Goodyear Tire & Rubber Company, The: *See—*
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Gordon, Woodford W. Method and apparatus for positioning maxillary and mandibular arch models for forming a gnathological positioner. 4,504,226, Cl. 433-63.000.
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Goto, Kiyoshi: *See—*
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Gotou, Hitoshi: *See—*
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Gotzmer, Carl: *See—*
Rizer, Janine M.; and Gotzmer, Carl, 4,504,320, Cl. 106-98.000.
Gould, Edward, Jr. Level. 4,503,623, Cl. 33-379.000.
Gould, Gordon; Soodak, Charles I.; and Thompson, Robert E., to Chevron Research Company. Hermetically sealed optical fiber. 4,504,112, Cl. 350-96.230.
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Goussin, Roger: *See—*
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Gradeler, Eric: *See—*
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Grady, John K.; and Rice, Richard E., to Grady, John K. Multiple X-ray image scanners. 4,504,859, Cl. 358-111.000.
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Andres, Rudolf; Grantz, Helmut; Munzel, Wolf-Dietrich; and Odebrecht, Wolfgang, 4,503,906, Cl. 165-104.210.
Grasse, Palmer, to Grasse, Palmer. Stripper oscillated head with shrouded drive and quick demountability. 4,504,093, Cl. 299-37.000.
Gratkowski, Kazmer. Wood splitting device. 4,503,894, Cl. 144-193.00A.
Gravure Research Institute, Inc.: *See—*
George, Harvey F.; and Toor, Yair, 4,504,354, Cl. 156-639.000.
Green, Andrew, to Composite Technology, Inc. Method of making composite member with transverse fibers. 4,504,343, Cl. 156-177.000.
Green, Edward A., to Eaton Corporation. Self-tensioning motor transmission control system. 4,503,726, Cl. 74-473.00R.
Greenwood, John C., to International Telephone and Telegraph Corporation. Load sensors. 4,503,715, Cl. 73-862.590.
Greenwood, William S., to Thomas & Betts Corporation. Cover for electrical receptacle. 4,504,698, Cl. 174-66.000.
Grendahl, Dennis T. Intraocular lens. 4,503,570, Cl. 3-13.000.
Greschner, Johann: *See—*
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Griesdorn, Carl P., to Planet Products Corporation. Sheet forming machine. 4,504,004, Cl. 226-150.000.
Griffie, Terry R.: *See—*
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Griffioen, Geurt, to Hommema Van 1825 B.V. Anode element for use in a cathodic protection system. 4,504,375, Cl. 204-196.000.
Griffiths, Anthony C. M., to Hyman International Limited. Method and apparatus for the continuous upward production of foamed material. 4,504,429, Cl. 264-40.500.
Grimm, Hans; and Richter, Gunter, to Maschinenfabrik Gehring GmbH & Co KG. Device for controlling reversal points of a reciprocating machining member. 4,504,917, Cl. 364-474.000.
Grint, Dean R. Protective doorknob encasement device. 4,503,692, Cl. 70-418.000.
Grollier, Jean F.; Rosenbaum, Georges; Allec, Josiane; and Shroot, Braham, to Societe Anonyme dite: L'Oreal. Preparation of anthralin solutions or suspensions in aromatic esters and their use for diseases of the skin and nails. 4,504,494, Cl. 514-544.000.
Gromak, Stephen C.: *See—*
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Grootte Bromhaar, Marinus J.: *See—*
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Groteke, Daniel E. Apparatus for filtration of molten metal. 4,504,392, Cl. 210-471.000.
Grubenmann, Arnold: *See—*
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Grudzinskas, Charles V.: *See—*
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Grumman Aerospace Corporation: *See—*
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Grunert, Margarete: *See—*
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Grupp, Gunter: *See—*
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Grupp, Ingrid L.: *See—*
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GTE Automatic Electric Incorporated: *See—*
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Reimer, William A., 4,504,101, Cl. 339-17.00L.
GTE Laboratories Incorporated: *See—*
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GTE Lenkurt Incorporated: *See—*
Chang, Chieh; and Lee, Man S., 4,504,804, Cl. 332-31.00R.
Lee, Man S.; and Chang, Chieh, 4,504,803, Cl. 332-31.00R.
GTE Products Corporation: *See—*
Newman, Ray L.; and Hopkins, David H., 4,503,904, Cl. 165-76.000.
Newman, Ray L.; and Hopkins, David H., 4,503,905, Cl. 165-76.000.
Gueret, Jean-Louis M., to L'Oreal. Make-up unit with a safety fastener. 4,503,872, Cl. 132-88.500.
Guers, Karl; and Beck, Rasmus, to Battelle-Institut e.V. Laser apparatus. 4,504,954, Cl. 372-61.000.
Guglielmo, Alfred R.: *See—*
Lockerby, W. Lee; and Guglielmo, Alfred R., 4,503,586, Cl. 17-48.000.
Guilino, Gunther; Barth, Rudolf; and Koppen, Werner, to Optische Werke G. Rodenstock. Spectacle lens with high positive refractive power. 4,504,128, Cl. 351-167.000.
Guinn, Ronald K.: *See—*
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Gunther, Karl-Heinz, to Kocks Technik GmbH & Co. Apparatus for bending laying tubes. 4,503,695, Cl. 72-133.000.
Gurley, Arnold E.: *See—*
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Gurubatham, Vincent P., to Whirlpool Corporation. Double-acting refrigerator door hinge and sliding lock-bolt. 4,503,582, Cl. 16-232.000.
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Gutmann, John W. System for storing and automatically retrieving recording discs. 4,504,878, Cl. 360-98.000.
Gutmann, Pedro: *See—*
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H. R. Smith (Technical Development) Limited: *See—*
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Goller, Ernst; and Walker, Fritz, 4,503,690, Cl. 66-149.00R.
Haak, Mark P.: *See—*
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Haas, Daniel R.: *See—*
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Haas, Franz, Jr.: *See—*
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Haas, Franz, Sr.; Haas, Franz, Jr.; and Haas, Johann. Baking plate. 4,503,759, Cl. 99-380.000.
Haas, Herbert: *See—*
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Haas, Johann: *See—*
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Hacker, Harald; Amann, Ulrich; Geisinger, Karl; and Engelhardt, Hans, to Maschinenfabrik Muller-Weingarten AG. Parts depository, particularly for large-area workpieces in a transfer press handling large workpieces. 4,503,766, Cl. 100-207.000.
Haddad, James H.; and Schatz, Klaus W., to Mobil Oil Corporation. Dropout boot for power recovery train. 4,504,291, Cl. 55-319.000.
Haffer, John J.; and Fredrick, Alan T., to Towmotor Corporation. Lift jack retention bracket. 4,503,935, Cl. 187-9.00E.
Haga, Takahiro; Koyanagi, Tohru; Nakajima, Toshio; and Ohshima, Takeshi, to Ishihara Sangyo Kaisha Ltd. Process for producing chloronicotinic acid compounds. 4,504,665, Cl. 546-318.000.
Hagar, Donald K.; and Geiger, Lyle D., to Eagleair, Inc. Burner register assembly. 4,504,216, Cl. 431-183.000.
Hagiwara, Taro: *See—*
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Haines, Robert C.; and Pridgeon, Royce, to Dunlop Limited. Tennisballs. 4,504,345, Cl. 156-213.000.

Hajdu, Istvan: *See*—
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Hakamada, Haruo: *See*—
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Hakansson, Carl J. N., to KMW Aktiebolag. Apparatus for handling white water in a twin-wire machine. 4,504,358, Cl. 162-264.000.

Hakko Co., Ltd.: *See*—
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Hale Fire Pump Company: *See*—
Eberhardt, H. Alfred, 4,503,812, Cl. 123-2.000.

Hall, John F., to Chrysler Corporation. Engine fuel supply system. 4,503,885, Cl. 137-574.000.

Hall, Robert E., to Macpac Products (N.Z.) Limited. Tramper's packs. 4,504,002, Cl. 224-211.000.

Halliburton Company: *See*—
Smith, Harry D., Jr.; Small, Tony M.; and Deaton, John G., 4,504,736, Cl. 250-256.000.

Hamada, Hideo: *See*—
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Hamada, Taizo: *See*—
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Haman, Daniel J., to Hewlett-Packard Company. Electrical load drive and control system. 4,504,779, Cl. 323-349.000.

Hamano, Isao, to Mitsubishi Denki Kabushiki Kaisha. Buffering mechanism for automotive starter. 4,503,719, Cl. 74-7.00E.

Hamashima, Yoshio: *See*—
Yoshioka, Mitsuru; Shoichiro, Uyeo; Hamashima, Yoshio; Kikkawa, Ikuo; Tsuji, Teruji; and Nagata, Wataru, 4,504,659, Cl. 544-92.000.

Hamayasu, Norio, to Shimano Industrial Company Limited. Fish hook. 4,503,634, Cl. 43-44.830.

Hamel, Jerome T.; and Huff, Bernard G., to Hantover, Inc. Pneumatic stunner. 4,503,585, Cl. 17-1.00B.

Hammond, Charles W., to Babcock & Wilcox Company, The. Method and apparatus for removing deposits from highly heated surfaces. 4,503,811, Cl. 122-392.000.

Hanada, Minoru; Tsunakawa, Mitsuaki; Tomita, Koji; Tsukiura, Hiroshi; and Kawaguchi, Hiroshi, to Bristol-Myers Company. Antibiotics produced by fermentation of a novel strain of *Streptomyces hygroscopicus*. 4,504,580, Cl. 435-74.000.

Hanahan, Donald J.; and Pinckard, R. Neal, to Board of Regents, The University of Texas System. Synthetic phosphoglycerides possessing platelet activating properties. 4,504,474, Cl. 514-78.000.

Handelsbolaget Eminent, Sven Hultman & Co.: *See*—
Nicolin, Curt, 4,504,179, Cl. 409-234.000.

Handi-Pac, Inc.: *See*—
Klawitter, Ronald R., 4,504,072, Cl. 280-11.310.

Handzel, James M. Swimming pool water circulation system. 4,503,573, Cl. 4-507.000.

Hansen, Elo H.; and Ruzicka, Jaromir, to Bifok AB. Stop-flow analysis. 4,504,443, Cl. 422-81.000.

Hanson, David G.; and Francis, Robert E., to Sperry Corporation. Synthetic persistence for raster scan displays. 4,504,827, Cl. 340-723.000.

Hantover, Inc.: *See*—
Hamel, Jerome T.; and Huff, Bernard G., 4,503,585, Cl. 17-1.00B.

Hara, Sadao; Moritani, Hiroaki; Kaga, Hisashi; Minaki, Toshihiro; Shibata, Kenichi; Ogawa, Junichi; and Umino, Kaoru, to Japan Steel Works, Ltd., The; and Nichias Corporation. Method for the insulation of heated metalic materials. 4,504,527, Cl. 427-318.000.

Hara, Seinosuke; and Miisho, Kazuyuki, to Nissan Motor Company, Limited. Variable valve timing arrangement for an internal combustion engine or the like. 4,503,818, Cl. 123-90.160.

Hara, Seishi: *See*—
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Harada, Susumu; and Hasegawa, Sakuro, to Nitto Boseki Co., Ltd. Process for producing monoallylamine polymer. 4,504,640, Cl. 526-193.000.

Hardy, George W.: *See*—
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Hardy, Michael J. Panel straightening apparatus and method. 4,503,701, Cl. 72-372.000.

Hargenrader, Richard J.; and Miller, James A., to Ingersoll-Rand Company. Carriage feed system. 4,503,917, Cl. 173-147.000.

Hargrove, Douglas L. Voltage wand. 4,504,781, Cl. 324-72.500.

Harig, Fred L. Independently moveable external rear view mirrors with connected frame mounts. 4,504,118, Cl. 350-626.000.

Harle, Anton, to Harle, Anton. Variable aspiration draining instrument. 4,504,266, Cl. 604-118.000.

Harpel, William L.; and Pilny, Richard J., to Betz Laboratories, Inc. Paint spray booth detackification composition and method. 4,504,395, Cl. 210-712.000.

Harrington, Richard H. Flying disc with weighted outer ring. 4,503,635, Cl. 446-46.000.

Harris Corporation: *See*—
Conn, James K.; and Patel, Sharadchandra D., 4,504,806, Cl. 333-241.000.
Hershberger, David L., 4,504,966, Cl. 381-15.000.

Harris, David H.: *See*—
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Harris, Eugene G., to National Distillers and Chemical Corporation. Cyclohexane derivatives in fragrance compositions. 4,504,412, Cl. 252-522.00R.

Hart, Stephen L.; and Anderson, Theodore G., II, to Hughes Aircraft Company. Buffer for an electron beam collector. 4,504,762, Cl. 313-30.000.

Hartig, Alfred, to Ruhrtal-Elektrizitatsgesellschaft Hartig GmbH & Co. Disconnect switch. 4,504,708, Cl. 200-48.00V.

Harting, Stanley C.: *See*—
Thomas, E. Raymond; Cahill, Lysle D.; Tibbits, John L.; Fraser, Kenneth D.; Keane, John F.; Harting, Stanley C.; Kramer, George H.; Duke, Ronald J.; Kessis, Theodore A.; Butler, John C.; Frank, Gary L.; and Lawson, John A., 4,504,126, Cl. 350-469.000.

Hartman, Kathy J.; and Shu, Winston R., to Mobil Oil Corporation. Thermal recovery method for optimum in-situ visbreaking of heavy oil. 4,503,911, Cl. 166-272.000.

Hartman, Robert L.; Koszi, Louis A.; and Schwartz, Bertram, to AT&T Bell Laboratories. Stripe-guide TJS laser. 4,504,952, Cl. 372-45.000.

Hartmann, Michel, to Entreprise Hartmann Pere et Fils. Tunnel oven and wagon. 4,504,221, Cl. 432-137.000.

Haruki, Kazuhito: *See*—
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Harwath, Frank A., to Allied Corporation. Miniature fuseholder. 4,504,815, Cl. 337-201.000.

Harwig, Hendrik A.; Slotboom, Jan W.; and Pelgrom, Marcellinus J. M., to U.S. Philips Corporation. Charge-coupled device. 4,504,930, Cl. 365-238.000.

Hase, Marie: *See*—
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Haseda, Satoshi: *See*—
Nakamura, Tetsuya; Hobo, Nobuhito; Tsuzuki, Yoshihiko; Suzuki, Yutaka; Haseda, Satoshi; and Masuda, Akira, 4,503,830, Cl. 123-501.000.

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Miyaki, Masahiko; Matsumura, Toshimi; Masuda, Akira; Sumitani, Sinya; Hasegawa, Takashi; and Hayakawa, Takahiro, 4,503,821, Cl. 123-357.000.

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Hasuike, Kazuo; Konishi, Kazunori; and Kurematsu, Akira, to Kokusai Denshindenwa Co., Ltd. Control system for a line scanning type output unit. 4,504,868, Cl. 358-280.000.

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Hatanaka, Masataka: *See*—
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Yui, Hiroshi; Sobajima, Yoshihiro; Higashide, Osamu; Imamura, Tsuyoshi; Okamura, Michiya; and Hattori, Satoru, 4,504,617, Cl. 524-426.000.
Hauni-Werke Korber & Co. KG: *See*—
Barbe, Karl-Heinz; and Berger, Erich, 4,503,867, Cl. 131-95.000.
Erdmann, Otto; and Deutsch, Reinhard, 4,503,967, Cl. 198-419.000.
Hautemont, Jean-Claude H., to Societe Anonyme dite: Etude et Realisation de Chaines Automatiques ERCA. Initial sterilization of sterile chamber of asceptic packaging machine. 4,503,656, Cl. 53-396.000.
Haville, George D., to BEI Electronics, Inc. Power saving regulated light emitting diode circuit. 4,504,776, Cl. 323-288.000.
Hawkins, Ralph G.: *See*—
Taylor, Benson T., Jr.; and Hawkins, Ralph G., 4,504,719, Cl. 219-10.55C.
Hayakawa, Takahiro: *See*—
Miyaki, Masahiko; Matsumura, Toshimi; Masuda, Akira; Sumitani, Sinya; Hasegawa, Takashi; and Hayakawa, Takahiro, 4,503,821, Cl. 123-357.000.
Hayakawa, Yoichi; and Ito, Yasunobu, to Aisin Warner Kabushiki Kaisha. Hydraulic control system for four-wheel drive transfer mechanism for vehicles. 4,503,927, Cl. 180-247.000.
Hayashi, Shunichi: *See*—
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Hayashikane Shipbuilding & Engineering Co. Ltd.: *See*—
Tada, Yoshikazu, 4,504,212, Cl. 431-86.000.
Hayes Microcomputer Products, Inc.: *See*—
Heatherington, Dale A., 4,504,802, Cl. 332-18.000.
Heat Exchange and Transfer, Inc.: *See*—
Meyer, Howard E., 4,504,352, Cl. 156-499.000.
Heatherington, Dale A., to Hayes Microcomputer Products, Inc. Digital PSK modulator for modem. 4,504,802, Cl. 332-18.000.
Heck, Klaus: *See*—
Lindner, Horst J.; Ufer, Peter P.; Heck, Klaus; and Schmoger, Gerhard, 4,504,370, Cl. 204-129.100.
Heckenbach, Terry A., to Johnson Service Company. Noise-neutralizing digital interface circuit. 4,504,959, Cl. 375-36.000.
Hefele, Josef, to Kufner Textilwerke GmbH. Process for the reinforcement of flexible flat parts, such as top cloths or linings for articles of clothing. 4,504,517, Cl. 427-13.000.
Hehl, Edward M.: *See*—
Swartzbaugh, Peter T.; and Hehl, Edward M., 4,503,985, Cl. 215-252.000.
Heidmann, Kurt R.; and Marsh, Andrew, to Allied Corporation. Disc brake and protective boot therefor. 4,503,947, Cl. 188-72.800.
Heidmann, Kurt R.; and Vorwerk, Donald A., to Allied Corporation. Disc brake thrust collar assembly. 4,503,948, Cl. 188-72.800.
Heil, Fred B.: *See*—
Winschel, Richard E., deceased; Heil, Fred B.; and Seibel, Robert V., 4,504,217, Cl. 431-183.000.
Heilmann, Horst: *See*—
Vogel, Wolfgang; Trinks, Werner; and Heilmann, Horst, 4,503,688, Cl. 66-85.00A.
Heilmeier & Weinhlein Fabrik fur Oel-Hydraulik GmbH & Co. KG: *See*—
Brunner, Rudolf, 4,503,882, Cl. 137-454.500.
Heinig, Charles F., Jr.: *See*—
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Heinrich Wunder GmbH KG: *See*—
Zoor, Reinhold, 4,504,078, Cl. 280-615.000.
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Heinze, Rudi; Roder, Rolf; and Feist, Wieland, to Jenoptik Jena G.m.b.H. Optical arrangement for an opto-electronic range-finder. 4,504,143, Cl. 356-5.000.
Heise, Nyles N.: *See*—
Bandy, Peter B.; Danen, John A.; Heise, Nyles N.; and Holtan, Donald C., 4,504,873, Cl. 360-63.000.
Helle, Antti; and Blomkvist, Villhard. Method of manufacturing a stick and a stick manufactured according to said method. 4,504,344, Cl. 156-185.000.
Helton, Marty D. Wood stove grate kit with low wood signal. 4,503,782, Cl. 110-186.000.
Heminover, Dale R.: *See*—
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Hemmi, Keiji: *See*—
Kitaura, Yoshihiko; Nakaguchi, Osamu; Hemmi, Keiji; Aratani, Matsuhiko; Takeno, Hidekazu; Okada, Satoshi; Tanaka, Hirokazu; Hashimoto, Masashi; Kuroda, Yoshio; Iguchi, Eiko; Kohsaka, Masanobu; Aoki, Hatsuo; and Imanaka, Hiroshi, 4,504,584, Cl. 435-253.000.
Hempel, Hans-Ulrich; Grunert, Margarete; Tesmann, Holger; and Muller, Heinz, to Henkel Kommanditgesellschaft. Organopolysiloxane anti-foaming agents. 4,504,410, Cl. 252-358.000.
Henke, Donald L.: *See*—
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Hempel, Hans-Ulrich; Grunert, Margarete; Tesmann, Holger; and Muller, Heinz, 4,504,410, Cl. 252-358.000.
Hennessey, Thomas M., to Adams Elevator Equipment Company. Push button electrical switch assembly. 4,504,713, Cl. 200-241.000.
Hep Products AB: *See*—
Stenlund, Stig, 4,504,069, Cl. 277-174.000.
Herchenbach, Horst: *See*—
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Hercules Incorporated: *See*—
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Hergeth Hollingsworth GmbH: *See*—
Hergeth, Hubert, 4,503,798, Cl. 414-225.000.
Hergeth, Hubert, to Hergeth Hollingsworth GmbH. Apparatus for removing fiber bales, in particular pressed bales of cotton. 4,503,798, Cl. 414-225.000.
Herlitze, Gerhard, to Intermedicate GmbH. Stiffening core for a catheter tube. 4,504,268, Cl. 604-170.000.
Hermann Berstorff Maschinenbau GmbH: *See*—
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Herring, Liles G., to Hercules Incorporated. Phenolic blast tube insulators for rocket motors. 4,504,532, Cl. 428-36.000.
Herron, Donn M.: *See*—
Davis, Ruth A.; Herron, Donn M.; Pervier, James W.; and Vines, Harvey L., 4,504,295, Cl. 62-30.000.
Hershberger, David L., to Harris Corporation. Stereo inhibitor for AM stereo receiver. 4,504,966, Cl. 381-15.000.
Herwig, Jens; Scheef, Hans-Volker; Schleppinghoff, Bernhard; and Lange, Peter M., to EC Erdolchemie GmbH; and Bayer Aktiengesellschaft. Process for the preparation of pure alkyl tert-alkyl ethers and hydrocarbon raffinates which are largely free from isoolefins and from alkanols. 4,504,688, Cl. 568-697.000.
Herzel, Joachim; Simeth, Claus; Mitze, Rudolf; and Ortner, Robert, to M.A.N. Roland Druckmaschinen Aktiengesellschaft. Mechanism for engaging, disengaging and adjusting applicator rollers with respect to the plate cylinder of printing machines. 4,503,771, Cl. 101-247.000.
Herzog, Kurt: *See*—
Kattner, Erich; and Herzog, Kurt, 4,504,845, Cl. 346-140.00R.
Hesse, Hans, to Krauss-Maffei Aktiengesellschaft. Rotary shock absorber. 4,503,952, Cl. 188-306.000.
Hesston Corporation: *See*—
Johnson, John F.; Buller, Richard J.; and Guinn, Ronald K., 4,503,643, Cl. 51-247.000.
Heuschen, Jean M. H.; Bussink, Jan; and Sederel, Willem L., to General Electric Company. Process of preparing a polymer mixture comprising polyvinyl chloride, a polycarbonate and a rubber like polymer. 4,504,623, Cl. 525-67.000.
Heuschen, Jean M. H.; Bussink, Jan; and Sederel, Willem L., to General Electric Company. Composition and process. 4,504,624, Cl. 525-67.000.
Hewitt, David K. Kiln furniture. 4,504,224, Cl. 432-258.000.
Hewlett-Packard Company: *See*—
Eatock, Fred L., 4,504,797, Cl. 330-293.000.
Haman, Daniel J., 4,504,779, Cl. 323-349.000.
Hickman, Howard M.: *See*—
Earl, Gary W.; and Hickman, Howard M., 4,504,666, Cl. 546-345.000.
Hicks, Hamilton. Fire-retardant polyurethane foam containing finely ground dry fire retardant particles containing a volatile active fire retardant component. 4,504,603, Cl. 521-85.000.
Hietanen, Esko; and Airaksinen, Pentti, to Oy W. Rosenlew AB. Valve actuator for a dosing pump for a paint toning machine. 4,503,721, Cl. 74-44.000.
Higaki, Yoshikazu; and Omori, Hiroyuki, to Mitsubishi Yuka Fine Chemicals Co., Ltd. Process for purifying dibromo-dicyanobutane. 4,504,423, Cl. 260-465.700.
Higashi, Takayoshi: *See*—
Noji, Takashi; Obata, Yoshiharu; and Higashi, Takayoshi, 4,504,738, Cl. 250-483.100.
Higashide, Osamu: *See*—
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Higashinakagawa, Emiko: *See*—
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Hilkenmeier, Jurgen: *See*—
Volke, Hans-Werner; Hilkenmeier, Jurgen; Kohlhage, Hermann; and Tewes, Udo, 4,504,161, Cl. 400-605.000.

Hillmann, Hans, to Vacuumschmelze GmbH. Method for the manufacture of a superconducting hollow conductor. 4,503,602, Cl. 29-599.000.
Hilton, Allan R., to Hilton (Products) Limited. Personnel elevating apparatus. 4,503,932, Cl. 182-113.000.
Hilton (Products) Limited: *See*—
Hilton, Allan R., 4,503,932, Cl. 182-113.000.
Hinkemeyer, Roy T., to Vision-Ease Corporation, The. Axis alignment gauge. 4,503,620, Cl. 33-185.00R.
Hiraga, Ryozo: *See*—
Kuroki, Yoichi; Yoshinari, Yukihiro; and Hiraga, Ryozo, 4,504,148, Cl. 356-401.000.
Hiramatsu, Akira: *See*—
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Hirano, Hirofumi; and Hasumi, Hitoshi, to Canon Denshi Kabushiki Kaisha. Compact serial printer with rack plate drive for type belt drum. 4,504,159, Cl. 400-148.000.
Hirano, Ryoichi; Namizaki, Hirofumi; Susaki, Wataru; and Tanaka, Toshio, to Mitsubishi Denki Kabushiki Kaisha. Liquid phase epitaxial growth technique. 4,504,328, Cl. 148-171.000.
Hirose, Masayoshi: *See*—
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Hirose, Namio: *See*—
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Kenbo, Yukio; Akiyama, Nobuyuki; Koizumi, Mitsuyoshi; and Kuni, Asahiro, 4,504,045, Cl. 269-21.000.
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Kushima, Tadao; Gooda, Masahiro; Soga, Tasao; and Yamamoto, Toshitaka, 4,503,597, Cl. 29-569.00R.
Masuda, Michio, 4,504,854, Cl. 358-44.000.
Nagano, Katsuyuki; Takahashi, Yasushi; Takasaki, Yoshitaka; and Tanaka, Mitsuo, 4,504,943, Cl. 370-79.000.
Nate, Kazuo; Inoue, Takashi; and Yokono, Hitoshi, 4,504,646, Cl. 528-16.000.
Nishiguchi, Takashi; and Tamura, Shingo, 4,504,940, Cl. 369-126.000.
Shibukawa, Suetaro; and Katada, Hiroshi, 4,503,823, Cl. 123-418.000.
Tanaka, Tatsumi; Hikita, Kiyoshi; Furuhashi, Masaru; Hatada, Toshio; Nakano, Katsuzi; and Arai, Akira, 4,503,907, Cl. 165-133.000.
Ueyanagi, Kiichi; Takahashi, Susumu; Umemoto, Yasunari; and Nakamura, Michiharu, 4,503,599, Cl. 29-571.000.
Yonezawa, Seiji; Horikoshi, Tatsuo; and Tsuyoshi, Toshiaki, 4,504,937, Cl. 369-44.000.
Yoshikawa, Isao; Tanimizu, Tooru; and Sugitani, Sinzi, 4,504,885, Cl. 361-342.000.
Yoshioka, Takatoshi; Kirihara, Seishin; Siga, Masao; Yoshida, Takehiko; Hisano, Katsukuni; Tan, Toshimi; and Kobayashi, Masahiro, 4,504,554, Cl. 428-683.000.
Hitachi Maxell, Ltd.: *See*—
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Hitachi Seiko Ltd.: *See*—
Kishi, Masakazu; and Suzuki, Yasuo, 4,504,722, Cl. 219-69.00P.
Hitzky, Leo J., to Goodyear Tire & Rubber Company, The. Pneumatic tire. 4,503,898, Cl. 152-209.00R.
Ho, Ting-Long: *See*—
Pollard, David D.; and Ho, Ting-Long, 4,504,850, Cl. 357-79.000.
Hobbs, Albert W., to Century Fabrications Ltd. Implement attachment devices for land vehicles. 4,504,077, Cl. 280-490.00R.
Hobo, Nobuhito: *See*—
Nakamura, Tetsuya; Hobo, Nobuhito; Tsuzuki, Yoshihiko; Suzuki, Yutaka; Haseda, Satoshi; and Masuda, Akira, 4,503,830, Cl. 123-501.000.
Hochman, Sherman W., to Wisconsin Gas Company. Fluid distribution lockout apparatus. 4,503,880, Cl. 137-377.000.
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Elter, Claus; Schneider, Karl U.; Schoning, Josef; Stach, Heinrich; and Stracke, Wilfried, 4,504,439, Cl. 376-391.000.
Hodge, Robert G.: *See*—
Williams, Benjamin J., Jr.; and Hodge, Robert G., 4,504,281, Cl. 48-195.000.
Hodogaya Chemical Co., Ltd.: *See*—
Yamaguchi, Toyohiko; Kashima, Koichi; Ozutsumi, Minoru; and Morinaga, Masaru, 4,504,651, Cl. 528-360.000.
Hoechst Aktiengesellschaft: *See*—
Berthold, Rudiger, 4,504,424, Cl. 260-513.600.
Hunger, Klaus; and Pesenacker, Manfred, 4,504,416, Cl. 534-742.000.
Ong, Sienling, 4,504,272, Cl. 8-543.000.
Rosner, Manfred; Urbanietz, Josef; Loewe, Heinz; Duwel, Dieter; and Kirsch, Reinhard, 4,504,490, Cl. 514-483.000.
Schoen, Klaus-Peter, 4,503,805, Cl. 118-649.000.
Timpl, Rupert; Brocks, Dietrich; Neubauer, Horst; and Strecker, Helmut, 4,504,587, Cl. 436-538.000.
Voigt, Hartmut; Muck, Karl-Friedrich; Bar, Helmut; Mader, Herbert; Burg, Karlheinz; and Sextro, Gunter, 4,504,670, Cl. 549-347.000.
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Hoechst-Roussel Pharmaceuticals Inc.: *See*—
Martin, Lawrence L.; Worm, Manfred; and Crichlow, Charles A., 4,504,680, Cl. 564-265.000.
Shutske, Gregory M., 4,504,669, Cl. 548-241.000.
Hofer, Peter H.; and Albach, Eberhard R., to Libbey-Owens-Ford Company. Apparatus and method for producing a laminar flow of constant velocity fluid along a substrate. 4,504,526, Cl. 427-248.100.
Hoffman-La Roche Inc.: *See*—
Felix, Arthur M.; Gillessen, Dieter; Studer, Rolf; Meienhofer, Johannes A.; and Trzeciak, Arnold, 4,504,415, Cl. 260-112.50R.
Hoffman, Philip A., to Solid State Chargers Research and Development Limited Partnership. Current regulating circuit. 4,504,774, Cl. 320-9.000.
Hofmann, Otto, to Messerschmitt-Boikow-Blohm Gesellschaft mit beschrankter Haftung. Photogrammetric device for aircraft and spacecraft for producing a digital terrain representation. 4,504,914, Cl. 364-456.000.
Hogsett, Robert F.: *See*—
Voelker, Dennis E.; Beckstead, Leo W.; and Hogsett, Robert F., 4,504,448, Cl. 423-54.000.
Hohenester, Hermann; and Hohenester, Wolfgang. Process for preparing low-fat meat products and in particular sausages with high protein content. 4,504,515, Cl. 426-641.000.
Hohenester, Wolfgang: *See*—
Hohenester, Hermann; and Hohenester, Wolfgang, 4,504,515, Cl. 426-641.000.
Hojo, Akimichi: *See*—
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Hokazono, Yasuzi: *See*—
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Holbein, Hans-Jurgen; Leiderer, Paul; and Schneider, Walter, to GAO Gesellschaft fuer Automation und Organisation mbH. Security with identifying marks printed in the substance of a paper layer. 4,504,357, Cl. 162-123.000.
Holden, Scott C., to Varian Associates, Inc. Air lock vacuum pumping methods and apparatus. 4,504,194, Cl. 417-48.000.
Hollandse Signaalapparaten B.V.: *See*—
Krouwel, Jan, 4,503,592, Cl. 28-219.000.
Hollinger, John D. Variable and reversible transmission. 4,504,248, Cl. 474-24.000.
Holstead, Colin: *See*—
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Bandy, Peter B.; Danen, John A.; Heise, Nyles N.; and Holtan, Donald C., 4,504,873, Cl. 360-63.000.
Holtman, Steve H.: *See*—
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Holub, Fred; and Floryan, Daniel E., to General Electric Company. Amide ether imide block copolymers. 4,504,632, Cl. 525-432.000.
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Holzer, Helmut, to Carl Freudenberg, Firma. Shaft sealing ring. 4,504,068, Cl. 277-164.000.
Homecrest Industries Incorporated: *See*—
Apissomian, Arthur A., 4,503,780, Cl. 108-27.000.
Hommema Van 1825 B.V.: *See*—
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Honda Giken Kogyo Kabushiki Kaisha: *See*—
Hasegawa, Shumpei; and Otobe, Yutaka, 4,503,829, Cl. 123-492.000.
Hasegawa, Shumpei, 4,503,834, Cl. 123-589.000.
Ida, Jinsei; Fujita, Tsutomu; Matsuo, Kenzaburo; Higuchi, Fumio; and Tamura, Mitsuo, 4,503,596, Cl. 29-568.000.
Shimizu, Yasuo; Asanuma, Nobuyoshi; and Kami, Yozo, 4,504,081, Cl. 280-714.000.
Honda, Yasuhiro; Ueno, Katumi; Nishizaki, Genichi; Kitahara, Harumi; and Kamioka, Hiroshi, to Citizen Watch Company Limited. Automatic assembling machine. 4,503,606, Cl. 29-701.000.
Honeywell-Elac-Nautik GmbH: *See*—
Drenkelfort, Hans, 4,504,931, Cl. 367-115.000.
Honeywell Inc.: *See*—
Jackman, Earle G., 4,504,856, Cl. 358-92.000.
Morgan, Avery A., 4,504,146, Cl. 356-350.000.
Planer, Norman G., 4,504,787, Cl. 324-142.000.
Honeywell Information Systems Inc.: *See*—
Boehme, Robert M., 4,504,830, Cl. 340-815.310.
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Speraggi, Marcello, 4,504,162, Cl. 400-621.000.
Honma, Masayuki, to Nissan Motor Company, Limited. Belt tensioner. 4,504,252, Cl. 474-112.000.
Hoogervorst, Thomas R.: *See*—
Swartz, Harold L.; Hoogervorst, Thomas R.; and Lane, Lynn R., 4,503,622, Cl. 33-366.000.

Hopkins, David H.: *See—*
Newman, Ray L.; and Hopkins, David H., 4,503,904, Cl. 165-76.000.
Newman, Ray L.; and Hopkins, David H., 4,503,905, Cl. 165-76.000.

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Hori, Shozo: *See—*
Kitsunai, Tomoyuki; Saito, Kiyotaka; and Hori, Shozo, 4,504,625, Cl. 525-71.000.

Horie, Seiji: *See—*
Makino, Naonori; Horie, Seiji; Kawamura, Kouichi; and Sato, Hideo, 4,504,559, Cl. 430-58.000.

Horiguchi, Satoru, to Dai Nippon Insatsu K.K. Plural-sheet detector. 4,504,961, Cl. 377-8.000.

Horike, Masanori: *See—*
Ebi, Yutaka; Fujii, Tadashi; Sekiya, Takuro; Horike, Masanori; Furukawa, Tatsuya; and Tachiki, Masaaki, 4,504,844, Cl. 346-140.00R.

Horikoshi, Tatsuo: *See—*
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Horiuchi, Mitsunori; Suzuki, Yoshihisa; Yasui, Yoshiharu; and Seiki, Kazuo, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Method and apparatus for yarn piecing in fasciated yarn spinning. 4,503,662, Cl. 57-261.000.

Horl, Ernst, to Parker-Hannifin Corporation. Seal for track chain link of tracked vehicles. 4,504,066, Cl. 277-84.000.

Hornack, Thomas R.: *See—*
Jarrett, Noel; and Hornack, Thomas R., 4,504,366, Cl. 204-1.00R.

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Hosoya, Katsumi, to Nissan Motor Company, Limited. Alarm system for signaling harmful drops in or low levels of engine oil pressure. 4,504,819, Cl. 340-60.000.

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Mello, William R., 4,504,824, Cl. 340-680.000.

Howard, Dean D.; and Cross, David C., to United States of America, Navy. Low sidelobe, high efficiency mirror antenna with twist reflector. 4,504,835, Cl. 343-755.000.

Howes, John G. B., to Smith and Nephew Associated Companies p.l.c. Method of cleaning soft contact lenses. 4,504,405, Cl. 252-106.000.

Howmedica, Inc.: *See—*
Mouradian, William H., 4,503,847, Cl. 128-92.0BC.

Hrdina, Zdenek: *See—*
Sorm, Miloslav; Langpaul, Josef; Ulbert, Karel; Kadlec, Karel; Skalicky, Stanislav; Brazdil, Miroslav; Nespurek, Stanislav; Kensa, Jaromir; Zvonicek, Miroslav; and Hrdina, Zdenek, 4,503,996, Cl. 222-321.000.

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Sitko, Jerry A.; Hrynkiw, John; and Brazeau, Marilyn I., 4,503,992, Cl. 220-90.400.

Hsia, Chung-hweng; Owen, Hartley; and Wright, Bernard S., to Mobil Oil Corporation. Olefin fractionation and catalytic conversion system. 4,504,691, Cl. 585-519.000.

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Cook, Peter W.; Hsieh, Hung-Hui; and Miranker, Glen S., 4,504,924, Cl. 364-787.000.

Huang, Cheng-Chung. Angular alignment sensor. 4,504,147, Cl. 356-363.000.

Hubbard Company: *See—*
Muse, Ralph F., 4,503,567, Cl. 2-237.000.

Hude, Anton: *See—*
Doerges, Alexander; Schlauer, Johann; Kriebel, Manfred; and Hude, Anton, 4,504,449, Cl. 423-228.000.

Hudgens, Stephen J.: *See—*
Ovshinsky, Stanford R.; Allred, David D.; Walter, Lee; and Hudgens, Stephen J., 4,504,518, Cl. 427-38.000.

Hudson, Henry A.: *See—*
Bond, Alan M.; Hudson, Henry A.; van den Bosch, Pierre A.; and Walter, Frederick L., 4,504,367, Cl. 204-1.00T.

Huff, Bernard G.: *See—*
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Huffman, David C., to Spraco, Inc. Apparatus for discharging two commingled fluids. 4,504,013, Cl. 239-424.000.

Hughes Aircraft Company: *See—*
Hart, Stephen L.; and Anderson, Theodore G., II, 4,504,762, Cl. 313-30.000.

Hughes, Edward T. E.: *See—*
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Hunger, Klaus; and Pesenacker, Manfred, to Hoechst Aktiengesellschaft. Azo compounds deriving from amino benzoic acid anilides and acetoacetylamino-benzimidazolone. 4,504,416, Cl. 534-742.000.

Hunt, Joe: *See—*
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Hunter, James R.; and Lazzarotti, S. James, to Warner & Swasey Company, The. Bridge type punch press. 4,503,741, Cl. 83-549.000.

Hunzinger, Jean J., to U.S. Philips Corporation. Method of multiplexing transmission chanels in a step-index optical fibre and device for carrying out the method. 4,504,111, Cl. 350-96.200.

Hurco Manufacturing Co., Inc.: *See—*
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Hurukado, Tatuhiko: *See—*
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Hussmann Corporation: *See—*
DiCarlo, Leonard J.; Ares, Roland A.; and Norton, Robert O., 4,503,685, Cl. 62-193.000.

Hyde, James S.: *See—*
Froncisz, Wojciech; and Hyde, James S., 4,504,788, Cl. 324-316.000.

Hydril Company: *See—*
Beam, Clark W.; and Crutchfield, Mark K., 4,504,037, Cl. 251-1.00A.

Hyman International Limited: *See—*
Griffiths, Anthony C. M., 4,504,429, Cl. 264-40.500.

Hypex, Incorporated: *See—*
Olson, Samson A.; and Williams, George C., 4,503,752, Cl. 91-48.000.

Iacovazzi, Michael A.: *See—*
Bystrianyk, Wasyl; Walker, Richard A.; Gardner, Edward B.; and Iacovazzi, Michael A., 4,504,301, Cl. 65-66.000.

Ichihara, Shoichi: *See—*
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Ichikawa, Yoshio: *See—*
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ICI Americas Inc.: *See—*
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ICI Pharma: *See—*
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Ida, Jinsei; Fujita, Tsutomu; Matsuo, Kenzaburo; Higuchi, Fumio; and Tamura, Mitsuo, to Honda Giken Kogyo Kabushiki Kaisha. Transfer type working system. 4,503,596, Cl. 29-568.000.

Idea Development Engineers of Arizona, Inc.: *See—*
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Igarashi, Sadao, to Alps Electric Co., Ltd. Microwave circuit apparatus. 4,504,796, Cl. 330-286.000.

Igi, Keishiro: *See—*
Murata, Yoshifumi; Igi, Keishiro; Narukawa, Hiroshi; Uetsuki, Masao; Bando, Satoshi; Kawai, Shuji; and Shirano, Kenji, 4,504,531, Cl. 428-35.000.

Ignacek, James F., to United States of America, Army. Ammunition magazine. 4,503,750, Cl. 89-34.000.

Iguchi, Eiko: *See—*
Kitaura, Yoshihiko; Nakaguchi, Osamu; Hemmi, Keiji; Aratani, Matsuhiko; Takeno, Hidekazu; Okada, Satoshi; Tanaka, Hirokazu; Hashimoto, Masashi; Kuroda, Yoshio; Iguchi, Eiko; Kohsaka, Masanobu; Aoki, Hatsuo; and Imanaka, Hiroshi, 4,504,584, Cl. 435-253.000.

Ikeda, Humihide: *See—*
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Ikeuchi, Mitsuru: *See—*
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Ilardo, Charles S.; and Duffy, James J., to Occidental Chemical Corporation. Flame retardant polyamide compositions. 4,504,611, Cl. 524-101.000.

Imada, Akira; Kintaka, Kazuhiko; and Shinagawa, Susumu, to Takeda Chemical Industries, Ltd. Substances potentiating the activity of antibiotics and their production. 4,504,655, Cl. 536-18.700.

Imai, Toshihiro; and Ogata, Yasuzi, to Olympus Optical Co., Ltd. Zoom lens system. 4,504,124, Cl. 350-427.000.

Imai, Yugo, to Olympus Optical Co., Ltd. Tape recorder. 4,504,874, Cl. 360-66.000.

Imaizumi, Tomio, to Tokico Ltd. Hydraulic damper having variable damping device. 4,503,951, Cl. 188-280.000.

Imamura, Tsuyoshi: *See—*
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Baker, Alan S., 4,504,275, Cl. 44-51.000.
Baker, Alan S., 4,504,276, Cl. 44-51.000.
Carr, Edward H.; Knight, Harry W.; and Turnock, Richard C., 4,504,789, Cl. 324-418.000.
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Padget, John C., 4,504,614, Cl. 524-284.000.
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Ina, Toshikazu: *See—*
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Inomata, Koichiro; Tateishi, Hiroshi; Higashinakagawa, Emiko; and Sato, Kanemitsu, to Tokyo Shibaura Denki Kabushiki Kaisha. Corrosion-resistant and wear-resistant magnetic amorphous alloy and a method for preparing the same. 4,504,327, Cl. 148-31.550.
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Inoue, Kiyoshi, to Inoue-Japax Research Incorporated. 3D EDM method and apparatus utilizing a magnetic field. 4,504,721, Cl. 219-69.00M.
Inoue, Shigeru; Ono, Hiroshi; Fukui, Akito; Fujii, Hidetsugu; Morikawa, Haruyuki; and Watanabe, Suguru, to Toyo Engineering Corporation. Process for synthesizing urea. 4,504,679, Cl. 564-67.000.
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Instance, David J. Method of making labels for containers. 4,504,348, Cl. 156-251.000.
Institut Cerac S.A.: *See—*
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Institut Francais du Petrole: *See—*
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Institut National de Recherche Chimique Appliquee (IRCHA): *See—*
Breque, Anne; Muller, Georges; Bonnard, Hubert; Mathey, Francois; and Savignac, Philippe, 4,504,683, Cl. 568-12.000.
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Church, Mark A.; and Decker, Stephen K., 4,504,880, Cl. 360-113.000.
Cook, Peter W.; Hsieh, Hung-Hui; and Miranker, Glen S., 4,504,924, Cl. 364-787.000.
Evans, Julie F.; Findlay, Hugh T.; Popyach, Stephen A.; and Tao, Deh C., 4,504,840, Cl. 346-76.0PH.
Gaind, Arun K.; Kulkarni, Subhash B.; and Poponiak, Michael R., 4,504,330, Cl. 148-175.000.
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Goel, Prabhakar; and McMahon, Maurice T., 4,504,784, Cl. 324-73.00R.
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Kuech, Thomas F.; and Meyerson, Bernard S., 4,504,331, Cl. 148-175.000.
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International Flavors & Fragrances Inc.: *See—*
Evers, William J.; Stork, Gilbert; Mookherjee, Braja D.; and Heinsohn, Howard H., Jr., 4,504,398, Cl. 252-8.600.
Pittet, Alan O.; Courtney, Thomas F., Jr.; and Muralidhara, Ranya, 4,504,508, Cl. 426-535.000.
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Greenwood, John C., 4,503,715, Cl. 73-862.590.
Inui, Emiko; Iwano, Takao; Hara, Seishi; Mikami, Yukio; Kurita, Hideo; and Aoki, Yoshiaki, to Pola Chemical Industries, Inc.; and Sanwa Chemical Industries, Inc., Ltd. Process for preparation of soap articles containing dried shapes of soap. 4,504,433, Cl. 264-232.000.
Irvin, John E., to Teleflex Incorporated. Lever control assembly. 4,503,730, Cl. 74-566.000.
Irvine, Antony J.; Leary, Bruce; and Such, Christopher H., to Dulux Australia Ltd. Aqueous dispersions. 4,504,618, Cl. 524-457.000.
Irwin, Everett F. Rotary cylinder engines with pistons having balanced loads. 4,503,754, Cl. 91-488.000.
Isaacs, Harold. Cart structure for stocking merchandise. 4,504,073, Cl. 280-33.99A.
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Ishihara, Keiichi; and Matsumoto, Fumio, to Yamato Mishin Seizo Kabushi Kaisha. Upper feed dog automatic regulator for overlock machine. 4,503,794, Cl. 112-313.000.
Ishihara Sangyo Kaisha Ltd.: *See—*
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Ishikawa, Shun-ichi; Nagano, Teruo; Tamoto, Koji; and Shinozaki, Fumiaki, to Fuji Photo Film Co., Ltd. Photopolymerizable compositions. 4,504,573, Cl. 430-288.000.
Ishikawa, Takatoshi: *See—*
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Itaya, Hiroshi; and Nakatsugawa, Kenji, to Anritsu Electric Company Limited. Multiprocessor system. 4,504,906, Cl. 364-200.000.
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Ito, Yoshiyuki: *See—*
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Itoh, Yoshie, to Wagner Shokai, Inc. Slot machine. 4,504,058, Cl. 273-143.00R.
ITT Industries, Inc.: *See—*
Achtstaetter, Gerhard, 4,504,862, Cl. 358-158.000.
Anden, Bengt; Ramstrom, Bengt; and Sodergard, Bengt, 4,503,942, Cl. 187-95.000.
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Iwaki, Yoshiyuki; Imori, Hideo; and Gotou, Hitoshi, to Mitsubishi Denki Kabushiki Kaisha. One piece molded voltage regulator and brush holder unit. 4,504,752, Cl. 310-68.00R.
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J. C. Penney Company, Inc.: *See*—
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Jackman, Earle G., to Honeywell Inc. Stereo television system. 4,504,856, Cl. 358-92.000.
Jackson, Emanuel L.; and Myers, Berlin F. Elbow brace for bowlers and golfers. 4,504,054, Cl. 273-54.00B.
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Jackson, Robert C., to Bebco Experimental and Manufacturing Company. Chain saw sharpening device. 4,503,735, Cl. 76-78.00R.
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Jaeger, Morris: *See*—
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Jahr, Ronald S.; and Cowell, Thomas H., to Systems and Support, Incorporated. Utility usage data and event data acquisition system. 4,504,831, Cl. 340-870.030.
Jako, Geza J. Laser surgery. 4,503,854, Cl. 128-303.100.
James W. Gardner Enterprises, Inc.: *See*—
Black, David J., 4,504,513, Cl. 426-632.000.
Janes, Norman F.: *See*—
Elliott, Michael; Janes, Norman F.; and Khambay, Bhypinder P. S., 4,504,491, Cl. 514-521 000.
Janko, Mike A.; and Broberg, David K., to Precision Electronics, Inc. System for monitoring video signal parameters, including the luminance signal. 4,504,851, Cl. 358-10.000.
Janney, Christopher. Apparatus and method for producing sound images derived from the movement of people along a walkway. 4,504,933, Cl. 367-197.000.
Jansen, Gerardus L. M., to U.S. Philips Corporation. Electrodynamic focus and radial slide drive for an optical disc system. 4,504,935, Cl. 369-32.000.
Jantzen, Steven L., to ACF Industries, Inc. Scissor support for welding tank sections. 4,504,047, Cl. 269-43.000.
Japan Steel Works, Ltd., The: *See*—
Hara, Sadao; Moritani, Hiroaki; Kaga, Hisashi; Minaki, Toshihiro; Shibata, Kenichi; Ogawa, Junichi; and Umino, Kaoru, 4,504,527, Cl. 427-318.000.
Japan Styrene Paper Corporation: *See*—
Adachi, Akira; Kubota, Takashi; Okada, Yukio; Miyazaki, Kenichi; and Hagiwara, Taro, 4,504,534, Cl. 428-71.000.
Kuwabara, Hideki; Yoshimura, Shohei; Yamaguchi, Toru; and Sudo, Yoshimi, 4,504,601, Cl. 521-58.000.
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Japan Synthetic Rubber Co., Ltd.: *See*—
Arakawa, Masatoshi; Yoshioka, Hayao; and Nakazawa, Kazuyoshi, 4,504,692, Cl. 585-633.000.
Jarret, Bertrand; Cordier, Rose; and Buffa, Gerard, to Lignes Telegraphiques et Telephoniques-L.T.T. System for transmitting digital signals over an optical fiber. 4,504,975, Cl. 455-608.000.
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Jarvis, Arthur B., to Mathographics Research Corporation. Aiding mathematical learning. 4,504,234, Cl. 434-188.000.
Jaskolski, Stanley V.: *See*—
Cartz, Louis; Weiss, Arnold; Schutten, Herman P.; Spellman, Gordon B.; Jaskolski, Stanley V.; and Wackman, Peter H., deceased, 4,504,964, Cl. 378-119.000.
Jasper, Edward D.: *See*—
Davis, Clifford, 4,503,633, Cl. 42-51.000.
Jauch, Karl, to Sodeco-Saia AG. Documents containing information invisible to the naked eye. 4,504,084, Cl. 283-94.000.
Jaun, Hans: *See*—
Bergkvist, Hans; and Jaun, Hans, 4,503,918, Cl. 175-27.000.
Jennings, John Edward: *See*—
Reid, James B., 4,503,723, Cl. 74-96.000.
Jenoptik Jena G.m.b.H.: *See*—
Heinze, Rudi; Roder, Rolf; and Feist, Wieland, 4,504,143, Cl. 356-5.000.
Jerde, James B.: *See*—
Rosa, Eugene J.; and Jerde, James B., 4,503,707, Cl. 73-336.500.
Jessee, Ralph D., to Westinghouse Electric Corp. Inverter firing control with error compensation. 4,504,899, Cl. 363-56.000.
Jinda, Kazuya: *See*—
Ueno, Haruo; Ashitaka, Hidetomo; Jinda, Kazuya; and Nakajima, Kouichi, 4,504,639, Cl. 526-146.000.
Johannes, Virgil I., to AT&T Bell Laboratories. Bridging channel port module. 4,504,944, Cl. 370-84.000.
Johnson, James Frederick John: *See*—
Pook, Harold W. M., 4,504,550, Cl. 428-461.000.
Johnson, John F.; Buller, Richard J.; and Guinn, Ronald K., to Hesston Corporation. Sharpener assembly for the cutting cylinder of a crop harvester. 4,503,643, Cl. 51-247.000.
Johnson, Lloyd D. Automatically calibrating meat analysis device. 4,504,963, Cl. 378-53.000.
Johnson, Mark R., to Dow Chemical Company, The. Polymerizable UV light stabilizers from isocyanatoalkyl esters of unsaturated carboxylic acids. 4,504,628, Cl. 525-278.000.
Johnson, Marvin M.: *See*—
McDaniel, Max P.; and Johnson, Marvin M., 4,504,638, Cl. 526-134.000.
Johnson, Richard A.; and Mattes, Hans G., to AT&T Bell Laboratories. Condition sensor. 4,504,922, Cl. 364-557.000.
Johnson Service Company: *See*—
Heckenbach, Terry A., 4,504,959, Cl. 375-36.000.
Johnson, Terence L.; and Guthreau, Lance, to Automatic Switch Company. Pilot-operated dual flow rate valve. 4,503,887, Cl. 137-624.130.
Johnston, Andrew E.: *See*—
MacInnes, Hugh; Meyer, Jon A.; Johnston, Andrew E.; and Fort, John W., Jr., 4,504,187, Cl. 415-1.000.
Jones, Corey N.; and Chapline, Thomas, to PSI Associates, Inc. Educational device for teaching collating skills. 4,504,235, Cl. 434-219.000.
Jones, Edward M., Jr., to Chemical Research & Licensing Company. Method for etherifications. 4,504,687, Cl. 568-697.000.
Jones, Graham R., to Inoventors Limited. Reflective road studs. 4,504,169, Cl. 404-11.000.
Jones, Robert L.: *See*—
Cantrell, Daniel V.; Bryant, Herman G., Jr.; Jones, Robert L.; Maccaferri, Marco A.; and McDaniel, William M., 4,503,869, Cl. 131-336.000.
Jonner, Wolf-Dieter: *See*—
Braschel, Volker; Jonner, Wolf-Dieter; and Leiber, Heinz, 4,504,911, Cl. 364-426.000.
Joo, Katsuhiro, to Shikoku Kakooki Co., Ltd. Cap heat-sealing apparatus for paper containers. 4,504,350, Cl. 156-380.800.
Jorgensen, Jorgen A.; and Nygren, Donald W., to Northland Aluminum Products, Inc. Portable turntable for use in microwave ovens. 4,504,715, Cl. 219-10.55F.
Joseph, Beresford C., to Middendorp Electric Co. Pty. Ltd. Electrical switching device. 4,504,742, Cl. 307-252.00N.
Joy Manufacturing Company: *See*—
Lazarus, Kenneth W., 4,503,879, Cl. 137-315.000.
Joyal Products, Inc.: *See*—
Szantho, Charles F.; and Riordan, Edward D., 4,504,724, Cl. 219-86.250.
Joyce, Michael. Two part snap hinge. 4,503,991, Cl. 220-339.000.
JSK Company Ltd.: *See*—
Bennison, Stewart; and Linnik, Ronald L., 4,504,183, Cl. 414-412.000.
Jude Engineering, Inc.: *See*—
Christian, Robert F., 4,504,222, Cl. 432-139.000.
Jung, Frederic H.; and Davies, Gareth M., to Imperial Chemical Industries PLC; and ICI Pharma. Cephalosporin-1-oxide derivatives. 4,504,478, Cl. 514-202.000.
Jussila, Olavi, to Kone Oy. Telfer carriage. 4,503,984, Cl. 212-205.000.
Juy, Henri, to Etablissements Le Simplex. Control device which provides a plurality of pre-established and controlled positions, more particularly for use with the speed gear shifting devices for cycles and the like. 4,504,250, Cl. 474-80.000.
Kabushiki Kaisha Bandai: *See*—
Nakanishi, Masahiro, 4,504,167, Cl. 403-325.000.
Kabushiki Kaisha Kobe Seiko Sho: *See*—
Kurumaji, Masanobu; Takeuchi, Naoki; Kondo, Hiroaki; Akita, Toshiaki; Sano, Tsutomu; and Sugano, Katsumi, 4,504,208, Cl. 425-589.000.
Kabushiki Kaisha Komatsu Seisakusho: *See*—
Baba, Kiyokazu, 4,503,969, Cl. 198-621.000.
Sugimoto, Yutaka; Taira, Kenji; and Fukushima, Akira, 4,503,931, Cl. 181-204.000.
Kabushiki Kaisha Morita Seisakusho: *See*—
Ota, Sadayasu; and Nishimoto, Shinichi, 4,503,853, Cl. 128-303.100.
Kabushiki Kaisha Sankosha: *See*—
Uchida, Susumu; and Tadokoro, Kazushige, 4,504,883, Cl. 361-119.000.
Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See*—
Horiuchi, Mitsunori; Suzuki, Yoshihisa; Yasui, Yoshiharu; and Seiki, Kazuo, 4,503,662, Cl. 57-261.000.
Kabushiki Kaisha Toyota Chuo Kenkyusho: *See*—
Taga, Yasunori; and Sawada, Yutaka, 4,504,109, Cl. 350-1.600.
Kabushiki Kaisha Yaskawa Denki Seisakusho: *See*—
Suzuki, Takeo; Matsumoto, Itsuro; Yurita, Yoshihiro; and Zenpo, Hideharu, 4,503,722, Cl. 74-96.000.

Kadlec, Emil G.: *See*—
Cyrus, Jack D.; Kadlec, Emil G.; and Klimas, Paul C., 4,504,192, Cl. 416-41.000.

Kadlec, Karel: *See*—
Sorm, Miloslav; Langpaul, Josef; Ulbert, Karel; Kadlec, Karel; Skalicky, Stanislav; Brazdil, Miroslav; Nespurek, Stanislav; Kensa, Jaromir; Zvonicek, Miroslav; and Hrdina, Zdenek, 4,503,996, Cl. 222-321.000.

Kadowaki, Hidejiro: *See*—
Aoki, Takao; Kadowaki, Hidejiro; and Iwami, Naoki, 4,504,137, Cl. 355-4.000.

Kaeding, Warren W.: *See*—
Forbus, Nancy P.; and Kaeding, Warren W., 4,504,690, Cl. 585-466.000.

Kaeriyama, Minoru: *See*—
Iwataki, Isao; Nakayama, Akira; Kaeriyama, Minoru; Ishikawa, Hisao; Hosaka, Hideo; and Kohara, Kenichi, 4,504,305, Cl. 71-98.000.

Kaga, Hisashi: *See*—
Hara, Sadao; Moritani, Hiroaki; Kaga, Hisashi; Minaki, Toshihiro; Shibata, Kenichi; Ogawa, Junichi; and Umino, Kaoru, 4,504,527, Cl. 427-318.000.

Kaiser, William J.; and Logothetis, Eleftherios M., to Ford Motor Company. Method of making a titanium dioxide oxygen sensor element by chemical vapor deposition. 4,504,522, Cl. 427-103.000.

Kajiwara, Hitoshi: *See*—
Kaneko, Akio; Kajiwara, Hitoshi; Haikawa, Yukihiko; and Nishiga, Kazuya, 4,504,968, Cl. 381-103.000.

Kakehashi, Ikutaro, to Roland Corporation. Sound effect control device for an electric guitar. 4,503,746, Cl. 84-1.160.

Kaltenbach & Voight GmbH and Co.: *See*—
Lohn, Gerd, 4,504,227, Cl. 433-131.000.

Kamata, Hideaki: *See*—
Ueno, Susumu; and Kamata, Hideaki, 4,504,349, Cl. 156-272.600.

Kamehara, Nobuo; Kurihara, Kazuaki; and Niwa, Koichi, to Fujitsu Limited. Method for producing multilayered glass-ceramic structure with copper-based conductors therein. 4,504,339, Cl. 156-89.000.

Kamei, Ryosuke; Tanaka, Toyoaki; Sano, Takeshi; and Kotani, Masataka, to Showa Denko Kabushiki Kaisha. Process for producing a monofilament having high tenacity. 4,504,432, Cl. 264-177.00F.

Kami, Yozo: *See*—
Shimizu, Yasuo; Asanuma, Nobuyoshi; and Kami, Yozo, 4,504,081, Cl. 280-714.000.

Kaminaka, Nobuyuki; Kanai, Kenji; Nomura, Noboru; and Omata, Yuji, to Matsushita Electric Industrial Co., Ltd. Thin film element. 4,504,540, Cl. 428-195.000.

Kamioka, Hiroshi: *See*—
Honda, Yasuhiro; Ueno, Katumi; Nishizaki, Genichi; Kitahara, Harumi; and Kamioka, Hiroshi, 4,503,606, Cl. 29-701.000.

Kamishima, Minoru: *See*—
Ohyaba, Takashi; Kamishima, Minoru; Kinoshita, Shozo; Kawamura, Tetsuo; and Matsuhisa, Hiroaki, 4,504,704, Cl. 179-115.5DV.

Kammerer, Gerd, to Dieter Graesslin Feinwerktechnik. Indexing element for switching a chronometer. 4,504,154, Cl. 368-74.000.

Kampf, Richard S.; and Winn, Richard W., to Beckman Instruments, Inc. Sample handling apparatus. 4,503,964, Cl. 198-341.000.

Kampfer, Helmut; Hase, Marie; and Glass, Max, to Agfa-Gevaert Aktiengesellschaft. Process for the preparation of N-sulfoalkyl quaternary salts of nitrogen heterocyclics. 4,504,668, Cl. 548-120.000.

Kan, Fumitaka: *See*—
Yoshikawa, Masao; Kan, Fumitaka; and Satomura, Hiroshi, 4,504,136, Cl. 355-3.0DD.

Kanai, Akira: *See*—
Shiba, Kazuo; Takahashi, Masao; Kanai, Akira; and Koizumi, Kouichi, 4,504,048, Cl. 269-71.000.

Kanai, Kenji: *See*—
Kaminaka, Nobuyuki; Kanai, Kenji; Nomura, Noboru; and Omata, Yuji, 4,504,540, Cl. 428-195.000.

Kanda, Mutsumi: *See*—
Okumura, Takeshi; Nakanishi, Kiyoshi; Kanda, Mutsumi; Kotani, Takeshi; and Inoue, Tokuta, 4,503,819, Cl. 123-188.00M.

Kaneko, Akio; Kajiwara, Hitoshi; Haikawa, Yukihiko; and Nishiga, Kazuya, to Alps Electric Co., Ltd. Equalizer apparatus having two dimensional display. 4,504,968, Cl. 381-103.000.

Kaneko, Hideki: *See*—
Fujishita, Kazuo; Kaneko, Hideki; Ushirokajitani, Yoshiyuki; and Kanno, Tadao, 4,503,810, Cl. 122-13.00R.

Kaneko, Tomomichi: *See*—
Yamamura, Yutaka; Kaneko, Tomomichi; and Hayashi, Shunichi, 4,504,571, Cl. 430-253.000.

Kaneko, Toshimi, to Murata Manufacturing Co., Ltd. Chip type discharge element with laminated insulating sheets. 4,504,766, Cl. 313-634.000.

Kanno, Hideyuki, to Tomy Kogyo Co., Inc. Toy having playing surface with rotating member located thereon. 4,504,056, Cl. 273-88.000.

Kanno, Tadao: *See*—
Fujishita, Kazuo; Kaneko, Hideki; Ushirokajitani, Yoshiyuki; and Kanno, Tadao, 4,503,810, Cl. 122-13.00R.

Kao Corporation: *See*—
Tsutsumi, Hisao; Inoue, Tomoko; and Ishida, Atsuo, 4,504,409, Cl. 252-351.000.

Kao Soap Co., Ltd.: *See*—
Takaishi, Naotake; Inamoto, Yoshiaki; Urata, Kouichi; Kawano, Junichi; and Tsutsumi, Hisao, 4,504,464, Cl. 424-63.000.

Kapland, Mitchell A.; and Robinson, Melville W., Jr., to Trident Engineering Associates, Inc. Process for treating and stabilizing chromium ore waste. 4,504,321, Cl. 106-117.000.

Kariyone, Kazuo: *See*—
Takagi, Hirofumi; Kunugita, Kiyohiko; Sawai, Hideki; and Kariyone, Kazuo, 4,504,471, Cl. 514-18.000.

Karr, Gerald S.: *See*—
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Kashima, Koichi: *See*—
Yamaguchi, Toyohiko; Kashima, Koichi; Ozutsumi, Minoru; and Morinaga, Masaru, 4,504,651, Cl. 528-360.000.

Katada, Hiroshi: *See*—
Shibukawa, Suetaro; and Katada, Hiroshi, 4,503,823, Cl. 123-418.000.

Kataoka, Hiroyuki: *See*—
Suzuki, Isao; Arai, Yoshio; and Kataoka, Hiroyuki, 4,504,969, Cl. 382-10.000.

Katims, Jefferson J. Method and apparatus for transcutaneous electrical stimulation. 4,503,863, Cl. 128-741.000.

Kato, Kunihiko; and Murahashi, Akihiko, to Victor Company of Japan, Ltd. Information scanning circuit for use with a detachable portable cassette tape recorder. 4,504,875, Cl. 360-72.100.

Kato, Mitsuhisa: *See*—
Saito, Taiji; Kato, Mitsuhisa; and Yasunaga, Kimioki, 4,503,679, Cl. 60-605.000.

Kato, Ryoki: *See*—
Sekimoto, Souichi; and Kato, Ryoki, 4,504,119, Cl. 350-336.000.

Kato, Sadamu: *See*—
Yomogida, Toshihiko; Sakurai, Itaru; Yokota, Tsuyoshi; and Kato, Sadamu, 4,504,900, Cl. 364-140.000.

Kato, Toshio: *See*—
Matsumoto, Hiroyuki; and Kato, Toshio, 4,504,848, Cl. 357-24.000.

Katsuma, Makoto: *See*—
Yamamoto, Hiroshi; Katsuma, Makoto; Murakami, Hiroyasu; and Hiramatsu, Akira, 4,504,760, Cl. 310-323.000.

Katsura Sangyo Co., Ltd.: *See*—
Yamaguchi, Toyohiko; Kashima, Koichi; Ozutsumi, Minoru; and Morinaga, Masaru, 4,504,651, Cl. 528-360.000.

Kattner, Erich; and Herzog, Kurt, to Siemens Aktiengesellschaft. Piezoelectric printing head for ink jet printer, and method. 4,504,845, Cl. 346-140.00R.

Katz, Lawrence E.; and Dumas, Richard H., to Olin Corporation. Process for oxidizing halopyridines to halopyridine-N-oxides. 4,504,667, Cl. 546-345.000.

Katzenstein, Jack. System and method for impact welding by magnetic propulsion. 4,504,714, Cl. 219-9.500.

Kawabata, Takashi, to Canon Kabushiki Kaisha. Automatic focusing device. 4,504,135, Cl. 354-402.000.

Kawabe, Tadashi: *See*—
Tanaka, Minoru; Kawabe, Tadashi; and Kobune, Masafumi, 4,504,453, Cl. 423-345.000.

Kawaguchi, Hiroshi: *See*—
Hanada, Minoru; Tsunakawa, Mitsuaki; Tomita, Koji; Tsukiura, Hiroshi; and Kawaguchi, Hiroshi, 4,504,580, Cl. 435-74.000.

Kawai, Hisasi: *See*—
Obayashi, Hideki; Kohama, Tokio; Saito, Kimitaka; Kawai, Hisasi; and Ina, Toshikazu, 4,503,713, Cl. 73-862.340.

Kawai, Shuji: *See*—
Murata, Yoshifumi; Igi, Keishiro; Narukawa, Hiroshi; Uetsuki, Masao; Bando, Satoshi; Kawai, Shuji; and Shirano, Kenji, 4,504,531, Cl. 428-35.000.

Kawamura, Kouichi: *See*—
Makino, Naonori; Horie, Seiji; Kawamura, Kouichi; and Sato, Hideo, 4,504,559, Cl. 430-58.000.

Kawamura, Tetsuo: *See*—
Ohyaba, Takashi; Kamishima, Minoru; Kinoshita, Shozo; Kawamura, Tetsuo; and Matsuhisa, Hiroaki, 4,504,704, Cl. 179-115.5DV.

Kawamura, Yoshio: *See*—
Hosaka, Sumio; Takanashi, Akihiro; Kurosaki, Toshiei; Kuniyoshi, Shinji; Kawamura, Yoshio; and Terasawa, Tsuneo, 4,504,726, Cl. 219-121.0LH.

Kawano, Junichi: *See*—
Takaishi, Naotake; Inamoto, Yoshiaki; Urata, Kouichi; Kawano, Junichi; and Tsutsumi, Hisao, 4,504,464, Cl. 424-63.000.

Kawara, Tatsuo: *See*—
Takenouchi, Osamu; Nguyen Chanh, Khe; Kawara, Tatsuo; and Tanaka, Hisami, 4,504,560, Cl. 430-72.000.

Kawasaki Jukogyo Kabushiki Kaisha: *See*—
Nishida, Toyomi; Suzuki, Takeshi; Hatamori, Takashi, and Terada, Sei, 4,504,020, Cl. 241-121.000.

Kawashima, Hiroki: *See*—
Kurahashi, Osamu; Tsuchida, Takayasu; Kawashima, Hiroki; Enei, Hitoshi; and Nakamori, Shigeru, 4,504,581, Cl. 435-107.000.

Kawashima, Yutaka: *See*—
Ninomiya, Masakazu; Suzuki, Atsushi; and Kawashima, Yutaka, 4,503,824, Cl. 123-436.000.

Kawazoe, Yasuyuki: *See*—
Maetani, Teruo; Miyoshi, Ryoichi; Nahara, Yukinori; Kawazoe, Yasuyuki; and Hamada, Taizo, 4,504,228, Cl. 433-199.000.

Kazmaier, Gunther: *See*—
Goller, Ernst; Kazmaier, Gunther; Trissler, Hans-Dieter; and Schmidt, Henning, 4,503,689, Cl. 66-149.00R.

Keane, John F.: *See*—
Thomas, E. Raymond; Cahill, Lysle D.; Tibbits, John L.; Fraser, Kenneth D.; Keane, John F.; Harting, Stanley C.; Kramer,

George H.; Duke, Ronald J.; Kessis, Theodore A.; Butler, John C.; Frank, Gary L.; and Lawson, John A., 4,504,126, Cl. 350-469.000.

Keeton, John H. Automatic elastic loop forming. 4,503,790, Cl. 112-121.270.

Kelderman, Gary L. Wheat swather. 4,503,660, Cl. 56-11.200.

Keller, John D. Radiation containment apparatus and method. 4,504,867, Cl. 358-247.000.

Keller, Rudolf. Method to improve the performance of non-consumable anodes in the electrolysis of metal. 4,504,369, Cl. 204-67.000.

Keller, Walter; Kutz, Johannes; and Severens, Gerhard, to Kusters, Eduard. Device for uniformly applying small amounts of fluid to moving webs. 4,503,802, Cl. 118-249.000.

Keller, William F.; and Sibley, Richard D., to Koso International, Inc. Shock actuated unit. 4,503,717, Cl. 74-2.000.

Kellner, Jordan D., to Kendall Company, The. Non-destructive cathodic disbondment testing of pipewrap coatings. 4,504,365, Cl. 204-1.00T.

Kelly, Gerard T. Blow-through pivotal sign. 4,503,631, Cl. 40-602.000.

Kelman, Charles D. Apparatus for and method of removal of material using ultrasonic vibration and lateral oscillation. 4,504,264, Cl. 604-22.000.

Keltner, Lawrence C. Process for the control of chalkbrood disease in leafcutter bees. 4,504,495, Cl. 514-760.000.

Kemme, Gregor, to Felix Schoeller Jr. GmbH & Co., KG. Photographic support paper having a surface size. 4,504,576, Cl. 430-538.000.

Kenbo, Yukio; Akiyama, Nobuyuki; Koizumi, Mitsuyoshi; and Kuni, Asahiro, to Hitachi, Ltd. Wafer transforming device. 4,504,045, Cl. 269-21.000.

Kendall Company, The: *See—*
Kellner, Jordan D., 4,504,365, Cl. 204-1.00T.

Kenny, Frances A.: *See—*
Bryant, Jimmy R.; Mertens, Waldemar W.; and Kenny, Frances A., 4,504,710, Cl. 200-80.00R.

Kensa, Jaromir: *See—*
Sorm, Miloslav; Langpaul, Josef; Ulbert, Karel; Kadlec, Karel; Skalicky, Stanislav; Brazdil, Miroslav; Nespurek, Stanislav; Kensa, Jaromir; Zvonicek, Miroslav; and Hrdina, Zdenek, 4,503,996, Cl. 222-321.000.

Kent, William C.; and Payne, Charles H., to AT&T Technologies, Inc. Method and apparatus for reflowing solder stripes on articles. 4,504,008, Cl. 228-180.200.

Kerr-McGee Chemical Corporation: *See—*
Lollar, Harvey N., Sr., 4,504,006, Cl. 227-152.000.

Kessis, Theodore A.: *See—*
Thomas, E. Raymond; Cahill, Lysle D.; Tibbits, John L.; Fraser, Kenneth D.; Keane, John F.; Harting, Stanley C.; Kramer, George H.; Duke, Ronald J.; Kessis, Theodore A.; Butler, John C.; Frank, Gary L.; and Lawson, John A., 4,504,126, Cl. 350-469.000.

Kessler, David R ; Beiswenger, David W.; and Makusij, Andrew J., to General Motors Corporation. Fuel injection apparatus. 4,503,826, Cl. 123-470.000.

Ketterer, Charles C., to Du Pont de Nemours, E. I., and Company. Polyester antifume additive for spandex fiber. 4,504,612, Cl. 524-101.000.

Kewpie Kabushiki Kaisha: *See—*
Hasegawa, Mineo; Yoshida, Kazuya; Miyauchi, Sakae; and Terazono, Masami, 4,504,583, Cl. 435-206.000.

Keys, Robert O., to Sherex Chemical Company, Inc. Ester-alcohol frothers for froth flotation of coal. 4,504,385, Cl. 209-166.000.

Keystone Lighting Corporation: *See—*
Mazis, Bernard, 4,504,891, Cl. 362-219.000.

Khambay, Bhypinder P. S.: *See—*
Elliott, Michael; Janes, Norman F.; and Khambay, Bhypinder P. S., 4,504,491, Cl. 514-521.000.

Khanna, Pyare, to Syva Company. Acetaminophen analogs, antigens, and antibodies. 4,504,413, Cl. 260-112.00R.

Khonsari, Ali M.: *See—*
Chen, Jamin; Khonsari, Ali M.; and Suciu, George D., 4,504,364, Cl. 203-45.000.

Khoury, Nick S., to Continental Can Company, Inc. Method of forming scored metal sheet. 4,504,181, Cl. 413-17.000.

Khoylian, Rouzas R.; Cowdery, James R.; and Park, David B., to Santrade Ltd. Relatch assembly for a conveyor system. 4,503,968, Cl. 198-472.000.

Khuri-Yakub, Butrus T.: *See—*
Kino, Gordon S.; Khuri-Yakub, Butrus T.; Bennett, Simon D.; and Liang, Kenneth K., 4,503,708, Cl. 73-628.000.

Kida, Katsuaki: *See—*
Kuwajima, Teruaki; Miwa, Hiroshi; Kida, Katsuaki; and Ishikura, Shinichi, 4,504,609, Cl. 523-501.000.

Kikkawa, Ikuo: *See—*
Yoshioka, Mitsuru; Shoichiro, Uyeo; Hamashima, Yoshio; Kikkawa, Ikuo; Tsuji, Teruji; and Nagata, Wataru, 4,504,659, Cl. 544-92.000.

Killinger, Karl H., to Singer Company, The. Cam controlled gate spring for chain stitch sewing machine. 4,503,791, Cl. 112-199.000.

Kim, Kwang K., to International Business Machines Corporation. Integrated resistor of niobium oxide passivating ring, gold corrosion barrier, and titanium resistive layer. 4,504,552, Cl. 428-620.000.

Kimble, James B.: *See—*
Parlman, Robert M.; and Kimble, James B., 4,504,384, Cl. 209-166.000.

Kimchi, Yigal: *See—*
Vardi, Isaih; Kimchi, Yigal; and Ben-Dror, Jonathan, 4,504,396, Cl. 210-800.000.

Kimura, Hiroyuki, to Canon Kabushiki Kaisha. Camera. 4,504,131, Cl. 354-173.100.

King, Ottis W. Valve actuator. 4,504,038, Cl. 251-58.000.

King, Richard R.: *See—*
Boult, George W.; and King, Richard R., 4,503,866, Cl. 131-84.00C.

Kino, Gordon S.; Khuri-Yakub, Butrus T.; Bennett, Simon D.; and Liang, Kenneth K., to Leland Stanford Junior University, Board of Trustees of the. Reflection acoustic microscope for precision differential phase imaging. 4,503,708, Cl. 73-628.000.

Kinoshita, Shozo: *See—*
Ohyaba, Takashi; Kamishima, Minoru; Kinoshita, Shozo; Kawamura, Tetsuo; and Matsuhisa, Hiroaki, 4,504,704, Cl. 179-115.5DV.

Kinsell, Robert C.: *See—*
Wieland, Kurt H.; Spencer, Donald M.; and Kinsell, Robert C., 4,503,683, Cl. 62-86.000.

Kintaka, Kazuhiko: *See—*
Imada, Akira; Kintaka, Kazuhiko; and Shinagawa, Susumu, 4,504,655, Cl. 536-18.700.

Kirchmayr, Rudolf; and Rutsch, Werner, to Ciba-Geigy Corporation. Acid-curable composition containing a masked curing catalyst, and a process for its preparation. 4,504,372, Cl. 204-159.150.

Kirihara, Seishin: *See—*
Yoshioka, Takatoshi; Kirihara, Seishin; Siga, Masao; Yoshida, Takehiko; Hisano, Katsukuni; Tan, Toshimi; and Kobayashi, Masahiro, 4,504,554, Cl. 428-683.000.

Kirsch, Reinhard: *See—*
Rosner, Manfred; Urbanietz, Josef; Loewe, Heinz; Duwel, Dieter; and Kirsch, Reinhard, 4,504,490, Cl. 514-483.000.

Kishi, Masakazu; and Suzuki, Yasuo, to Hitachi Seiko Ltd. Fully automated machining apparatus optimization for electric discharge machining apparatus. 4,504,722, Cl. 219-69.00P.

Kishida, Kazuo; Sasaki, Isao; and Mori, Hiroshi, to Mitsubishi Rayon Co. Ltd. Flame retardant polyester resin compositions. 4,504,608, Cl. 523-444.000.

Kishikawa, Kanichi; Nishino, Taneharu; and Nagasoe, Seiichi, to Nippon Steel Corporation. Method and apparatus for rolling rails. 4,503,699, Cl. 72-222.000.

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Kissam, Allan D., to United States of America, Commerce. Acoustic thawing of frozen food. 4,504,498, Cl. 426-238.000.

Kissau, Gerd: *See—*
Schnabel, Rolf; Kissau, Gerd; Weitz, Hans-Martin; and Fischer, Rolf, 4,504,676, Cl. 560-244.000.

Kitahara, Harumi: *See—*
Honda, Yasuhiro; Ueno, Katumi; Nishizaki, Genichi; Kitahara, Harumi; and Kamioka, Hiroshi, 4,503,606, Cl. 29-701.000.

Kitamura, Masatsugu; Inami, Mamoru; Tanaka, Yoshiaki; and Otsuki, Zenju, to Victor Company of Japan, Ltd. Automatic level adjustment with means for minimizing drop-out effects. 4,504,870, Cl. 360-25.000.

Kitaura, Yoshihiko; Nakaguchi, Osamu; Hemmi, Keiji; Aratani, Matsuhiko; Takeno, Hidekazu; Okada, Satoshi; Tanaka, Hirokazu; Hashimoto, Masashi; Kuroda, Yoshio; Iguchi, Eiko; Kohsaka, Masanobu; Aoki, Hatsuo; and Imanaka, Hiroshi, to Fujisawa Pharmaceutical Co., Ltd. Cultures of novel strains of Streptomyces. 4,504,584, Cl. 435-253.000.

Kitsunai, Tomoyuki; Saito, Kiyotaka; and Hori, Shozo, to Denki Kagaku Kogyo Kabushiki Kaisha. Thermoplastic resin composition containing iminated copolymer. 4,504,625, Cl. 525-71.000.

Klar, Erhard; Hashiguchi, Don H.; and Dietrich, Ronald J., to SCM Corporation. Cupreous catalyst and process making same. 4,504,597, Cl. 502-225.000.

Klaubert, Dieter H.; and Bell, Stanley C., to American Home Products Corporation. Process for the production of 2,6-diaminobenzonitrile derivatives. 4,504,660, Cl. 544-163.000.

Klawitter, Ronald R., to Handi-Pac, Inc. Adjustable skate fastener. 4,504,072, Cl. 280-11.310.

Klimas, Paul C.: *See—*
Cyrus, Jack D.; Kadlec, Emil G.; and Klimas, Paul C., 4,504,192, Cl. 416-41.000.

Klockner-Humboldt-Deutz AG: *See—*
Wolter, Albrecht; and Herchenbach, Horst, 4,504,319, Cl. 106-100.000.

Klomp, Edward D.; and Kosek, Thomas P., to General Motors Corporation. Annular valve stratified charge spark ignition engines. 4,503,817, Cl. 123-79.00R.

Klutz, Nathaniel, Jr.; and Spector, George. Dry spot remover composition and container comprising white talc and eucalyptus oil. 4,504,407, Cl. 252-162.000.

KMW Aktiebolag: *See—*
Dyren, Karl E. A.; and Strandberg, Gustaf S., 4,504,386, Cl. 209-254.000.
Hakansson, Carl J. N., 4,504,358, Cl. 162-264.000.

Knapp, Joseph E.: *See—*
Rosenblatt, David H.; Rosenblatt, Aaron A.; and Knapp, Joseph E., 4,504,442, Cl. 422-37.000.

Kniat, John; Kuhlberg, Joel F.; and Mickey, Daniel A., to United Technologies Corporation. Cooling means. 4,504,030, Cl. 244-57.000.

Knight, Harry W.: *See—*
Carr, Edward H.; Knight, Harry W.; and Turnock, Richard C., 4,504,789, Cl. 324-418.000.

Knoop, Donald E.; and Mundy, David W., to Whirlpool Corporation. Automatic liquid control system for a clothes washing machine. 4,503,575, Cl. 8-158.000.

Knudsen, Knud C. B., to Superfos A/S. Gypsum conversion. 4,504,458, Cl. 423-552.000.

Kobayashi, Kazutsugu: *See*—
Tanaka, Shinichi; Matsuda, Ikuo; Hirose, Namio; and Kobayashi, Kazutsugu, 4,504,934, Cl. 369-18.000.

Kobayashi, Masahiro: *See*—
Yoshioka, Takatoshi; Kirihara, Seishin; Siga, Masao; Yoshida, Takehiko; Hisano, Katsukuni; Tan, Toshimi; and Kobayashi, Masahiro, 4,504,554, Cl. 428-683.000.

Kobayashi, Nobuyuki; and Ito, Hiroshi, to Toyota Jidosha Kabushiki Kaisha. Electronic engine control system. 4,503,822, Cl. 123-416.000.

Koblitz, Francis F.; and Reichart, Jane L., to Dentsply Research & Development Corp. Process for filling teeth. 4,504,231, Cl. 433-228.000.

Kobori, Toshio: *See*—
Nakai, Masaaki; Kogure, Yasuzi; Sahara, Masayoshi; and Kobori, Toshio, 4,504,133, Cl. 354-266.000.

Kobune, Masafumi: *See*—
Tanaka, Minoru; Kawabe, Tadashi; and Kobune, Masafumi, 4,504,453, Cl. 423-345.000.

Koch, Dietmar, to Kraftwerk Union Aktiengesellschaft. Biaxial electrical compact drive, in particular a positioning drive. 4,504,753, Cl. 310-75.00R.

Koch, Klaus; and Syrbius, Gerhard, to Hermann Berstorff Maschinenbau GmbH. Press installation. 4,503,764, Cl. 100-117.000.

Kochs Adler AG: *See*—
Scholl, Hans, 4,503,789, Cl. 112-121.140.

Kocks Technik GmbH & Co.: *See*—
Gunther, Karl-Heinz, 4,503,695, Cl. 72-133.000.

Koeleman, Gerardus A. J.; and van de Laarschot, Franciscus A. A. E., to Oce-Nederland B.V. Method and apparatus for sensing a supply of sheets in a magazine. 4,503,960, Cl. 192-127.000.

Koensgen, Jean-Pierre: *See*—
Bichara, Michel; Koensgen, Jean-Pierre; Bodu, Michel; Meriaux, Michel; and Zimmermann, Jean-Pierre, 4,504,092, Cl. 299-5.000.

Koga, Motoyuki, to Hakko Co., Ltd. Pig for repairing interior portions of a pipeline. 4,504,204, Cl. 425-11.000.

Kogure, Yasuzi: *See*—
Nakai, Masaaki; Kogure, Yasuzi; Sahara, Masayoshi; and Kobori, Toshio, 4,504,133, Cl. 354-266.000.

Kohama, Tokio: *See*—
Obayashi, Hideki; Kohama, Tokio; Saito, Kimitaka; Kawai, Hisasi; and Ina, Toshikazu, 4,503,713, Cl. 73-862.340.

Kohara, Kenichi: *See*—
Iwataki, Isao; Nakayama, Akira; Kaeriyama, Minoru; Ishikawa, Hisao; Hosaka, Hideo; and Kohara, Kenichi, 4,504,305, Cl. 71-98.000.

Kohlhage, Hermann: *See*—
Volke, Hans-Werner; Hilkenmeier, Jurgen; Kohlhage, Hermann; and Tewes, Udo, 4,504,161, Cl. 400-605.000.

Kohno, Takeshi; Haruki, Kazuhito; and Nagase, Yasuo, to Tokyo Shibaura Denki Kabushiki Kaisha. Postal matter sorting apparatus. 4,503,977, Cl. 209-564.000.

Kohsaka, Masanobu: *See*—
Kitaura, Yoshihiko; Nakaguchi, Osamu; Hemmi, Keiji; Aratani, Matsuhiko; Takeno, Hidekazu; Okada, Satoshi; Tanaka, Hirokazu; Hashimoto, Masashi; Kuroda, Yoshio; Iguchi, Eiko; Kohsaka, Masanobu; Aoki, Hatsuo; and Imanaka, Hiroshi, 4,504,584, Cl. 435-253.000.

Koizumi, Hideaki, to Hitachi, Ltd. Apparatus capable of measurement of profile of emission line spectrum. 4,504,145, Cl. 356-300.000.

Koizumi, Kouichi: *See*—
Shiba, Kazuo; Takahashi, Masao; Kanai, Akira; and Koizumi, Kouichi, 4,504,048, Cl. 269-71.000.

Koizumi, Mitsuyoshi: *See*—
Kenbo, Yukio; Akiyama, Nobuyuki; Koizumi, Mitsuyoshi; and Kuni, Asahiro, 4,504,045, Cl. 269-21.000.

Kojima, Akihiro: *See*—
Sakamoto, Yasuhiro; Saita, Koji; and Kojima, Akihiro, 4,504,764, Cl. 313-403.000.

Kojima, Junpei: *See*—
Shiga, Akinobu; Sasaki, Toshio; and Kojima, Junpei, 4,504,637, Cl. 526-119.000.

Kokubun, Kenichi: *See*—
Doi, Hideaki; Kokubun, Kenichi; Sakagami, Teruo; and Murayama, Naohiro, 4,504,631, Cl. 525-327.300.

Kokusai Denshindenwa Co., Ltd.: *See*—
Hasuike, Kazuo; Konishi, Kazunori; and Kurematsu, Akira, 4,504,868, Cl. 358-280.000.

Kolesnikova, Nina I.: *See*—
Motov, David L.; Tjurkina, Ljudmila P.; Godneva, Maria M.; Kolesnikova, Nina I.; Yakusheva, Galina G.; Ivanovich, Metelkin A., deceased; and Fedorovna, Chibisova N., administrator, 4,504,271, Cl. 8-94.250.

Kollmorgen Technologies Corporation: *See*—
Leech, Edward J., 4,504,607, Cl. 523-427.000.
Semones, Burley C.; and Reiss, Leon G., 4,504,755, Cl. 310-156.000.

Kolodjski, Kenneth J., to Kolodjski, Kenneth J. Constant temperature anemometer. 4,503,706, Cl. 73-204.000.

Komai, Takahiko: *See*—
Matsumura, Kaname; and Komai, Takahiko, 4,504,256, Cl. 474-250.000.

Komori Printing Machine Co., Ltd.: *See*—
Urakawa, Hidetaka; and Aoki, Toshiyuki, 4,503,772, Cl. 101-409.000.

Kondo, Hiroaki: *See*—
Kurumaji, Masanobu; Takeuchi, Naoki; Kondo, Hiroaki; Akita, Toshiaki; Sano, Tsutomu; and Sugano, Katsumi, 4,504,208, Cl. 425-589.000.

Kone Oy: *See*—
Jussila, Olavi, 4,503,984, Cl. 212-205.000.

Konieczka, Edmund T. Table saw with multiple blade turret. 4,503,739, Cl. 83-471.100.

Konishi, Kazunori: *See*—
Hasuike, Kazuo; Konishi, Kazunori; and Kurematsu, Akira, 4,504,868, Cl. 358-280.000.

Konishiroku Photo Industry Co., Ltd.: *See*—
Nozaki, Hiromi; and Yoshida, Eiichi, 4,504,139, Cl. 355-14.00R.
Serizawa, Moriyoshi; and Hakamada, Haruo, 4,504,026, Cl. 242-71.100.
Shiozawa, Takao, 4,504,053, Cl. 271-34.000.
Yamamoto, Takeshi; and Gotc, Kiyoshi, 4,504,567, Cl. 430-165.000.

Konno, Mitsuo: *See*—
Okatsuka, Hisashi; Taniguchi, Koichi; Konno, Mitsuo; and Narita, Ryuho, 4,504,718, Cl. 219-10.55B.

Kooiman, Pieter L. Device for stacking of articles of which the upper most article of the stack is maintained automatically at a certain level. 4,503,980, Cl. 211-41.000.

Koppen, Werner: *See*—
Guilino, Gunther; Barth, Rudolf; and Koppen, Werner, 4,504,128, Cl. 351-167.000.

Kordomenos, Panagiotis I., to Ford Motor Company. Thermosetting coating composition—I. 4,504,606, Cl. 523-400.000.

Korsunsky, Iosif: *See*—
Bakermans, Johannes C. W.; and Korsunsky, Iosif, 4,504,887, Cl. 361-399.000.

Kosek, Thomas P.: *See*—
Klomp, Edward D.; and Kosek, Thomas P., 4,503,817, Cl. 123-79.00R.

Kosinski, Sandra G.; Lemaire, Paul J.; and O'Connor, Paul B., to AT&T Bell Laboratories. Optical fiber preform manufacturing method. 4,504,297, Cl. 65-3.110.

Koso International, Inc.: *See*—
Keller, William F.; and Sibley, Richard D., 4,503,717, Cl. 74-2.000.

Koszi, Louis A.: *See*—
Hartman, Robert L.; Koszi, Louis A.; and Schwartz, Bertram, 4,504,952, Cl. 372-45.000.

Kotani, Masataka: *See*—
Kamei, Ryosuke; Tanaka, Toyoaki; Sano, Takeshi; and Kotani, Masataka, 4,504,432, Cl. 264-177.00F.

Kotani, Takeshi: *See*—
Okumura, Takeshi; Nakanishi, Kiyoshi; Kanda, Mutsumi; Kotani, Takeshi; and Inoue, Tokuta, 4,503,819, Cl. 123-188.00M.

Kotter, Wolfgang: *See*—
Fischer, Gunter; Kotter, Wolfgang; and Laschke, Robert, 4,503,728, Cl. 74-527.000.

Koyanagi, Tohru: *See*—
Haga, Takahiro; Koyanagi, Tohru; Nakajima, Toshio; and Ohshima, Takeshi, 4,504,665, Cl. 546-318.000.

Kraftwerk Union Aktiengesellschaft: *See*—
Koch, Dietmar, 4,504,753, Cl. 310-75.00R.

Kramer, Arthur W., to Westinghouse Electric Corp. Heat exchanger tube sheet radial support. 4,503,903, Cl. 165-76.000.

Kramer, Charles F., to Steel Heddle Mfg. Co. Releasable heddle rod connector. 4,503,890, Cl. 139-92.000.

Kramer, George H.: *See*—
Thomas, E. Raymond; Cahill, Lysle D.; Tibbits, John L.; Fraser, Kenneth D.; Keane, John F.; Harting, Stanley C.; Kramer, George H.; Duke, Ronald J.; Kessis, Theodore A.; Butler, John C.; Frank, Gary L.; and Lawson, John A., 4,504,126, Cl. 350-469.000.

Krans, Richard. Sailing craft. 4,503,795, Cl. 114-39.000.

Krass, Dennis K.; Crano, John C.; and Newman, Melvin S., to PPG Industries, Inc. Method for preparing aldoxime or ketoxime-O-alkanoic acid. 4,504,671, Cl. 560-21.000.

Krause, Erich, to PKM Projektionsgesellschaft. High frequency generator for welding apparatus. 4,504,720, Cl. 219-10.770.

Krauss-Maffei Aktiengesellschaft: *See*—
Hesse, Hans, 4,503,952, Cl. 188-306.000.

Kreft, Rolf H., to Ventilatorenfabrik Oelde GmbH. Tubular-filter device with compressed-air cleanout. 4,504,288, Cl. 55-302.000.

Kreonite, Inc.: *See*—
Moore, Dwane L., 4,504,005, Cl. 226-190.000.

Kriebel, Manfred: *See*—
Doerges, Alexander; Schlauer, Johann; Kriebel, Manfred; and Hude, Anton, 4,504,449, Cl. 423-228.000.

Krouwel, Jan, to Hollandse Signaalapparaten B.V. Felting machine for sliver or yarn. 4,503,592, Cl. 28-219.000.

Kruglak, Ivan T.: *See*—
Bell, Steven A.; and Kruglak, Ivan T., 4,504,130, Cl. 352-92.000.

Krumrein, Gerhard, to Telefunken Electronic GmbH. Flasher unit. 4,504,820, Cl. 340-81.00R.

Kruppert Enterprises, Inc.: *See*—
Kruppert, Frederick W., 4,504,042, Cl. 266-115.000.

Kruppert, Frederick W., to Kruppert Enterprises, Inc. Apparatus for heat treating steel. 4,504,042, Cl. 266-115.000.

Kruse, Clifford L. Solar desalination system and method. 4,504,362, Cl. 203-3.000.

Krutsch, John R.: *See*—
Barlow, Gordon A.; and Krutsch, John R., 4,504,243, Cl. 446-447.000.
Kubiak, Teresa M.: *See*—
Folkers, Karl; Bowers, Cyril Y.; Kubiak, Teresa M.; and Stepinski, Janusz, 4,504,414, Cl. 260-112.5LH.
Kubis, Charles S.: *See*—
Roth, Donals J.; Kubis, Charles S.; and Walter, John, 4,503,990, Cl. 220-276.000.
Kubo, Yoshizo; and Utagawa, Ikuo, to Alps Electric Co., Ltd. Input device. 4,504,700, Cl. 178-18.000.
Kubota, Takashi: *See*—
Adachi, Akira; Kubota, Takashi; Okada, Yukio; Miyazaki, Kenichi; and Hagiwara, Taro, 4,504,534, Cl. 428-71.000.
Kuda, Vladimir: *See*—
Novak, Jiri; Pjgrt, Jan; Bezdicek, Jan; Fenik, Milan; Kuda, Vladimir; and Vasicek, Vladimir, 4,503,891, Cl. 139-116.000.
Kudo, Masaki: *See*—
Ozawa, Kiyomi; Hatanaka, Masataka; Hirose, Masayoshi; and Kudo, Masaki, 4,504,483, Cl. 514-351.000.
Kudo, Shiro; and Mukaiyama, Megumi, to Asahi-matsu Foods Inc.; and Takeda Chemical Industries, Ltd. Soybean-based fibrous or granular food material having improved texture. 4,504,514, Cl. 426-634.000.
Kuech, Thomas F.; and Meyerson, Bernard S., to International Business Machines Corporation. Silicon dopant source in intermetallic semiconductor growth operations. 4,504,331, Cl. 148-175.000.
Kuehnle, Manfred R.; Matkan, Josef; and Fraser, Kenneth D., to Coulter Systems Corporation. Method and apparatus for developing electrostatic latent images. 4,504,138, Cl. 355-10.000.
Kufner Textilwerke GmbH: *See*—
Hefele, Josef, 4,504,517, Cl. 427-13.000.
Kuhlberg, Joel F.: *See*—
Kniat, John; Kuhlberg, Joel F.; and Mickey, Daniel A., 4,504,030, Cl. 244-57.000.
Kuhn, Lowell L.; and Miggels, Stephen G., to Allis-Chalmers Corporation. Combine visor with environmental components. 4,503,749, Cl. 98-2.110.
Kukes, Simon G.; and Banks, Robert L., to Phillips Petroleum Company. Olefin metathesis and catalyst. 4,504,694, Cl. 585-643.000.
Kulesza, Ralph J.; Disko, Harry; and Gibbons, Dennis R., to Marvin Glass & Associates. Toy land vehicle and aircraft combination. 4,504,239, Cl. 446-95.000.
Kulkarni, Subhash B.: *See*—
Gaind, Arun K.; Kulkarni, Subhash B.; and Poponiak, Michael R., 4,504,330, Cl. 148-175.000.
Kumar, Ananda H.: *See*—
Adwalpalker, Avinash S.; Kumar, Ananda H.; and Weisman, Renee L., 4,504,322, Cl. 134-1.000.
Kuni, Asahiro: *See*—
Kenbo, Yukio; Akiyama, Nobuyuki; Koizumi, Mitsuyoshi; and Kuni, Asahiro, 4,504,045, Cl. 269-21.000.
Kunicki, Wojciech; and Jackson, Gilbert S., to OPT Systems. Ozone generator. 4,504,446, Cl. 422-186.190.
Kunig, Helmut, to S.A. des Ateliers Houget Duesberg Bosson. Needle bar drawing device. 4,503,589, Cl. 19-129.00R.
Kunikyo, Tomoo, to Agency of Industrial Science and Technology. Computer network system. 4,504,945, Cl. 370-88.000.
Kuniyoshi, Shinji: *See*—
Hosaka, Sumio; Takanashi, Akihiro; Kurosaki, Toshiei; Kuniyoshi, Shinji; Kawamura, Yoshio; and Terasawa, Tsuneo, 4,504,726, Cl. 219-121.0LH.
Kunugita, Kiyohiko: *See*—
Takagi, Hirofumi; Kunugita, Kiyohiko; Sawai, Hideki; and Kariyone, Kazuo, 4,504,471, Cl. 514-18.000.
Kupies, Dieter: *See*—
Gartner, Roderich; Cornils, Boy; Bexten, Ludger; and Kupies, Dieter, 4,504,588, Cl. 502-24.000.
Kurahashi, Koichiro, to Sumitomo Rubber Industries, Inc. Process and apparatus for producing wood heads of golf clubs. 4,504,520, Cl. 427-44.000.
Kurahashi, Osamu; Tsuchida, Takayasu; Kawashima, Hiroki; Enei, Hitoshi; and Nakamori, Shigeru, to Ajinomoto Company Incorporated. Method for producing L-histidine by fermentation. 4,504,581, Cl. 435-107.000.
Kuraray Co., Ltd.: *See*—
Murata, Yoshifumi; Igi, Keishiro; Narukawa, Hiroshi; Uetsuki, Masao; Bando, Satoshi; Kawai, Shuji; and Shirano, Kenji, 4,504,531, Cl. 428-35.000.
Kureha Kagaku Kogyo Kabushiki Kaisha: *See*—
Doi, Hideaki; Kokubun, Kenichi; Sakagami, Teruo; and Murayama, Naohiro, 4,504,631, Cl. 525-327.300.
Suzuki, Seiichi; and Tomita, Eihachiro, 4,504,773, Cl. 320-1.000.
Yoshikumi, Chikao; Fujii, Takayoshi; Saito, Kenichi; Fujii, Masahiko; and Niimura, Koichi, 4,504,487, Cl. 514-492.000.
Kuramatsu, Akira: *See*—
Hasuike, Kazuo; Konishi, Kazunori; and Kuramatsu, Akira, 4,504,868, Cl. 358-280.000.
Kurihara, Kazuaki: *See*—
Kamehara, Nobuo; Kurihara, Kazuaki; and Niwa, Koichi, 4,504,339, Cl. 156-89.000.
Kurita, Hideo: *See*—
Inui, Emiko; Iwano, Takao; Hara, Seishi; Mikami, Yukio; Kurita, Hideo; and Aoki, Yoshiaki, 4,504,433, Cl. 264-232.000.
Kurita, Kazuo; and Ishihara, Hideaki, to Toyo Boseki Kabushiki Kaisha. Polyamide fibers having improved properties and their production. 4,504,545, Cl. 428-364.000.
Kurkov, Victor P., to Chevron Research Company. 3-Isoxazolin-5-one fungicides. 4,504,486, Cl. 514-380.000.
Kuroda, Masayuki: *See*—
Miki, Yutaka; Kuroda, Masayuki; and Omori, Tetsumi, 4,504,099, Cl. 384-543.000.
Kuroda, Yoshio: *See*—
Kitaura, Yoshihiko; Nakaguchi, Osamu; Hemmi, Keiji; Aratani, Matsuhiko; Takeno, Hidekazu; Okada, Satoshi; Tanaka, Hirokazu; Hashimoto, Masashi; Kuroda, Yoshio; Iguchi, Eiko; Kohsaka, Masanobu; Aoki, Hatsuo; and Imanaka, Hiroshi, 4,504,584, Cl. 435-253.000.
Kurokawa, Harushige: *See*—
Nakayama, Satoshi; Takeuchi, Hideaki; Murota, Junichi; Hurukado, Tatuhiko; Takeda, Shigeru; Suzuki, Masuo; Kurokawa, Harushige; and Ikeda, Humihide, 4,503,807, Cl. 118-719.000.
Kuroki, Yoichi; Yoshinari, Yukihiro; and Hiraga, Ryozo, to Canon Kabushiki Kaisha. System for detecting a signal for aligning two bodies and signal processing method. 4,504,148, Cl. 356-401.000.
Kurosaki, Toshiei: *See*—
Hosaka, Sumio; Takanashi, Akihiro; Kurosaki, Toshiei; Kuniyoshi, Shinji; Kawamura, Yoshio; and Terasawa, Tsuneo, 4,504,726, Cl. 219-121.0LH.
Kurosawa, Kei, to Tokyo Shibaura Denki Kabushiki Kaisha. Method of making field oxide regions. 4,504,333, Cl. 148-187.000.
Kurth, Charles W.; and Moerchen, John M., to Alton Packaging Corporation. Carton for packaging a semi-solid bulk form. 4,504,497, Cl. 426-130.000.
Kurth, Josef: *See*—
Titz, Siegfried; Langel, Matthias; Wissinger, Waldemar; and Kurth, Josef, 4,504,210, Cl. 425-461.000.
Kurumaji, Masanobu; Takeuchi, Naoki; Kondo, Hiroaki; Akita, Toshiaki; Sano, Tsutomu; and Sugano, Katsumi, to Kabushiki Kaisha Kobe Seiko Sho. Mold clamping device for injection molding machine. 4,504,208, Cl. 425-589.000.
Kushima, Tadao; Gooda, Masahiro; Soga, Tasao; and Yamamoto, Toshitaka, to Hitachi, Ltd. Method of forming a number of solder layers on a semiconductor wafer. 4,503,597, Cl. 29-569.00R.
Kusters, Eduard: *See*—
Keller, Walter; Kutz, Johannes; and Severens, Gerhard, 4,503,802, Cl. 118-249.000.
Wilms, Friedrich, 4,503,642, Cl. 51-139.000.
Kusuda, Takao: *See*—
Mihara, Toshihiro; Kusuda, Takao; Noma, Koichi; and Taki, Hiromitsu, 4,504,218, Cl. 431-326.000.
Kutz, Johannes: *See*—
Keller, Walter; Kutz, Johannes; and Severens, Gerhard, 4,503,802, Cl. 118-249.000.
Kuwabara, Hideki; Yoshimura, Shohei; Yamaguchi, Toru; and Sudo, Yoshimi, to Japan Styrene Paper Corporation. Process for producing pre-foamed particles of polypropylene resin. 4,504,601, Cl. 521-58.000.
Kuwabara, Hideki; Yoshimura, Shohei; Yamaguchi, Toru; and Sudo, Yoshimi, to Japan Styrene Paper Corporation. Process for producing polyolefin resin particles. 4,504,653, Cl. 528-491.000.
Kuwajima, Teruaki; Miwa, Hiroshi; Kida, Katsuaki; and Ishikura, Shinichi, to Nippon Paint Co., Ltd. Aqueous coating composition. 4,504,609, Cl. 523-501.000.
Kuwayama, Tetsuro, to Canon Kabushiki Kaisha. Color imaging device. 4,504,855, Cl. 358-44.000.
Kuyper, Geoffrey S., to AMSTED Industries Incorporated. Method of preventing segregation of metal powders. 4,504,441, Cl. 419-35.000.
Kvikk s.f.: *See*—
Palmason, Jon A., 4,503,588, Cl. 17-61.000.
Kyodo Electric Co., Ltd.: *See*—
Ishii, Nobuyoshi; and Yamada, Yukihiko, 4,504,180, Cl. 411-5.000.
Kyowa Gas Chemical Industry Co., Ltd.: *See*—
Uehara, Hiroshi; and Shimizu, Tohru, 4,504,616, Cl. 524-398.000.
Kyushu Hitachi Maxell, Ltd.: *See*—
Ochiai, Masahiko, 4,504,707, Cl. 200-42.00R.
L. V. J. Corporation: *See*—
Vignerot, Eugene; and Law, W. S., 4,504,841, Cl. 346-104.000.
Labbe , Clement. Capo. 4,503,747, Cl. 84-318.000.
Lachmann, Hans-Peter. Conveying plant. 4,503,971, Cl. 198-833.000.
Lacoste, Jean P., to Thomson-CSF. Device for correcting a videofrequency television signal by dynamic attenuation of the noise level. 4,504,863, Cl. 358-167.000.
Laferty, John M.: *See*—
Carpenter, Kent H.; and Laferty, John M., 4,504,461, Cl. 423-593.000.
Lagneau, Jean H. Emptying apparatus for a silo. 4,504,177, Cl. 406-86.000.
Laitram Corporation, The: *See*—
Fowler, John T., 4,503,621, Cl. 33-361.000.
Lam, Kyle T.: *See*—
Berwick, James D.; and Lam, Kyle T., 4,504,871, Cl. 360-31.000.
Lancaster, Patrick R., III: *See*—
Mouser, Curtis A.; Roberts, Mark G.; Haas, Daniel R.; and Lancaster, Patrick R., III, 4,503,658, Cl. 53-399.000.
Landoni, Gianluigi: *See*—
Fontanelli, Renzo; Landoni, Gianluigi; and Legnani, Giovanni, 4,504,610, Cl. 524-96.000.
Landre , Jean-Francois: *See*—
Begrich, Rainer; and Landre , Jean-Francois, 4,504,273, Cl. 8-549.000.

Lane, Barry. Album with removable pages and enclosure. 4,503,974, Cl. 206-457.000.

Lane, Lynn R.: *See*—
Swartz, Harold L.; Hoogervorst, Thomas R.; and Lane, Lynn R., 4,503,622, Cl. 33-366.000.

Lang, Gerard; and Malaval, Alain, to L'Oreal. Protein derivative containing grafted ultraviolet-absorbing radicals, the process for its preparation and composition in which it is present. 4,504,644, Cl. 527-201.000.

Langdon, William K., to BASF Wyandotte Corporation. Non-ionic surface-active agents coupled with carbonates or carboxylic esters. 4,504,418, Cl. 260-463.000.

Lange, Peter M.: *See*—
Herwig, Jens; Scheef, Hans-Volker; Schleppinghoff, Bernhard; and Lange, Peter M., 4,504,688, Cl. 568-697.000.

Langel, Matthias: *See*—
Titz, Siegfried; Langel, Matthias; Wissinger, Waldemar; and Kurth, Josef, 4,504,210, Cl. 425-461.000.

Langer Biomechanics Group, Inc., The: *See*—
Polchaninoff, Michael, 4,503,705, Cl. 73-172.000.

Langpaul, Josef: *See*—
Sorm, Miloslav; Langpaul, Josef; Ulbert, Karel; Kadlec, Karel; Skalicky, Stanislav; Brazdil, Miroslav; Nespurek, Stanislav; Kensa, Jaromir; Zvonicek, Miroslav; and Hrdina, Zdenek, 4,503,996, Cl. 222-321.000.

Lantech, Inc.: *See*—
Mouser, Curtis A.; Roberts, Mark G.; Haas, Daniel R.; and Lancaster, Patrick R., III, 4,503,658, Cl. 53-399.000.

Larikka, Leo, to G.A. Serlachius Oy. Apparatus for making a hole and a hole-surrounding collar in the side of a pipe. 4,503,693, Cl. 72-71.000.

Laschke, Robert: *See*—
Fischer, Gunter; Kotter, Wolfgang; and Laschke, Robert, 4,503,728, Cl. 74-527.000.

Laser Manufacturing Technologies, Inc.: *See*—
Reum, Stanley L., 4,504,956, Cl. 378-107.000.

Laurel Bank Machine Co., Ltd.: *See*—
Oka, Yoshinobu, 4,504,916, Cl. 364-471.000.

Lauritzen, Ted, to United States of America, Energy. Apparatus producing constant cable tension for intermittent demand. 4,504,023, Cl. 242-54.00R.

Lautenschlager, Hans-Heiner; Hilboll, Gerd; Friehe, Hugo; and Lohr, Josef P., to A. Nattermann & Cie GmbH. 6-{5-[ω-(1-Imidazolyl)-alkyl]-thien-2-yl}-3-oxo-2,3,4,5-tetrahydro-pyridazines and acid addition salts thereof and a process for the treatment of inflammatory atherosclerotic and thrombo-embolic, illnesses in humans. 4,504,479, Cl. 514-252.000.

Law, W. S.: *See*—
Vignerot, Eugene; and Law, W. S., 4,504,841, Cl. 346-104.000.

Lawrence, Fitzroy L.; and Tinios, Pantelis G., to Westinghouse Electric Corp. Elevator system. 4,503,939, Cl. 187-29.00R.

Lawson, John A.: *See*—
Thomas, E. Raymond; Cahill, Lysle D.; Tibbits, John L.; Fraser, Kenneth D.; Keane, John F.; Harting, Stanley C.; Kramer, George H.; Duke, Ronald J.; Kessis, Theodore A.; Butler, John C.; Frank, Gary L.; and Lawson, John A., 4,504,126, Cl. 350-469.000.

Lay, Joachim E. Rotary turboengine and supercharger. 4,504,196, Cl. 417-355.000.

Lazarus, Kenneth W., to Joy Manufacturing Company. Plug mechanism for wellhead tool. 4,503,879, Cl. 137-315.000.

Lazzarotti, S. James: *See*—
Hunter, James R.; and Lazzarotti, S. James, 4,503,741, Cl. 83-549.000.

Leary, Bruce: *See*—
Irvine, Antony J.; Leary, Bruce; and Such, Christopher H., 4,504,618, Cl. 524-457.000.

LeBus, Charles F. Hunting broadhead arrow. 4,504,063, Cl. 273-422.000.

Lee, James K.: *See*—
Martin, William A.; and Lee, James K., 4,504,132, Cl. 354-195.100.

Lee, Man S.; and Chang, Chieh, to GTE Lenkurt, Incorporated. Switched capacitor AM modulator/demodulator. 4,504,803, Cl. 332-31.00R.

Lee, Man S.: *See*—
Chang, Chieh; and Lee, Man S., 4,504,804, Cl. 332-31.00R.

Lee, Ross A., to Du Pont de Nemours, E. I., and Company. Heat-developable film containing silver sulfonate physical developer. 4,504,575, Cl. 430-531.000.

Leech, Edward J., to Kollmorgen Technologies Corporation. Epoxy resin coating composition for printed circuit boards. 4,504,607, Cl. 523-427.000.

Lefler, Harold V., III, to Dow Corning Corporation. Clay filled silicone elastomeric emulsions. 4,504,621, Cl. 524-783.000.

Le Fur, Raphael: *See*—
Horodniceanu, Florian; and Le Fur, Raphael, 4,504,547, Cl. 428-407.000.

Legnani, Giovanni: *See*—
Fontanelli, Renzo; Landoni, Gianluigi; and Legnani, Giovanni, 4,504,610, Cl. 524-96.000.

Leiber, Heinz: *See*—
Braschel, Volker; Jonner, Wolf-Dieter; and Leiber, Heinz, 4,504,911, Cl. 364-426.000.

Leiderer, Paul: *See*—
Holbein, Hans-Jurgen; Leiderer, Paul; and Schneider, Walter, 4,504,357, Cl. 162-123.000.

Leila, Lennox M.: *See*—
Pryputsch, Gunter G.; Leila, Lennox M.; Parkinson, Gerald E.; and Arneson, Leonard A., 4,503,760, Cl. 99-447.000.

Leininger, Joel C.: *See*—
Moore, Victor S.; and Leininger, Joel C., 4,504,904, Cl. 364-200.000.

Leininger, Steven, to Tandy Corporation. Apparatus for alpha-numeric/graphic display. 4,504,826, Cl. 340-721.000.

Leland, John E., to Phillips Petroleum Company. Poly(arylene sulfide) compositions. 4,504,551, Cl. 428-419.000.

Leland Stanford Junior University, Board of Trustees of the: *See*—
Kino, Gordon S.; Khuri-Yakub, Butrus T.; Bennett, Simon D.; and Liang, Kenneth K., 4,503,708, Cl. 73-628.000.

Lemaire, Paul J.: *See*—
Kosinski, Sandra G.; Lemaire, Paul J.; and O'Connor, Paul B., 4,504,297, Cl. 65-3.110.

Lembke, Andreas F.: *See*—
Underberg, Emil E. J.; and Lembke, Andreas F., 4,504,496, Cl. 426-11.000.

LeMire, Edward A.: *See*—
LeMire, George J.; Heinig, Charles F., Jr.; and LeMire, Edward A., 4,504,387, Cl. 210-101.000.

LeMire, George J.; Heinig, Charles F., Jr.; and LeMire, Edward A. System and method for water purification. 4,504,387, Cl. 210-101.000.

Lenchin, Julianne M.: *See*—
Bell, Harvey; Lenchin, Julianne M.; and Zwiercan , Gary A., 4,504,509, Cl. 426-549.000.

Lenk, Erich: *See*—
Schippers, Heinz; Lenk, Erich; Martens, Gerhard; Mayer, Manfred; Pieper, Werner; and Putsch, Siegfried, 4,504,021, Cl. 242-18.100.

Leong, Henry; and Fiumefreddo, John, to Challenger Circle F, Inc. Unitary wiring device body. 4,504,104, Cl. 339-63.00R.

Lequin, Claude G.: *See*—
Battarel, Andre P.; and Lequin, Claude G., 4,504,098, Cl. 308-10.000.

Leroy, Daniel: *See*—
Mallen-Herrero, Jose ; and Leroy, Daniel, 4,503,928, Cl. 180-308.000.

Lesher, George Y.; and Singh, Baldev, to Sterling Drug Inc. [5(or 4)-(Pyridinyl)-2-pyrimidinyl]ureas and cardiotonic use thereof. 4,504,482, Cl. 514-275.000.

Leuning, Wilfred D., to D & W Industries, Inc. Device for atomizing a liquid. 4,504,014, Cl. 239-433.000.

Lever Brothers Company: *See*—
Biernoth, Gerhard; and Merk, Werner, 4,504,503, Cl. 426-312.000.

Levie, Stephen A.; and Taylor, William E., to Litton Systems, Inc. Magnetron mode detector. 4,504,767, Cl. 315-101.000.

Levy, Richard H.; and Mockett, Paul M. Method and apparatus for determining the density characteristics of underground earth formations. 4,504,438, Cl. 376-156.000.

Lew, Hyok S. Dolly equipped with loading-unloading scissor hoist. 4,503,983, Cl. 212-187.000.

Lewarchik, Ronald J.; Murphy, Edward J.; and Beeks, Elaine C., to DeSoto, Inc. Ultraviolet cured coating method to provide stone chip resistance. 4,504,374, Cl. 204-181.00C.

Lewis, Lloyd J., to Modular Engineering Corporation. Dispenser for cup lids and straws. 4,503,982, Cl. 211-184.000.

LGZ Landis & Gyr Zug AG: *See*—
Pilloud, Bernard, 4,504,705, Cl. 179-2.510.

Li, Hung-Wen. Combination lock. 4,503,691, Cl. 70-312.000.

Liang, Kenneth K.: *See*—
Kino, Gordon S.; Khuri-Yakub, Butrus T.; Bennett, Simon D.; and Liang, Kenneth K., 4,503,708, Cl. 73-628.000.

Libbey-Owens-Ford Company: *See*—
Hofer, Peter H.; and Albach, Eberhard R., 4,504,526, Cl. 427-248.100.

Licciardi, Anthony L., to Back-Ease Products, Inc. Apparatus for supporting a user in an inverted position. 4,503,845, Cl. 128-75.000.

Licentia Patent-Verwaltungs-GmbH: *See*—
Winterhoff, Horst, 4,503,714, Cl. 73-862.360.

Lien, Samuel Q. S.; and Nakos, Steven T., to Loctite Corporation. Polymers with graft α-alkylacrylate functionality. 4,504,629, Cl. 525-288.000.

Lighting Concept Products Limited: *See*—
Chan, Johnny C., 4,504,890, Cl. 362-203.000.

Lignes Telegraphiques et Telephoniques-L.T.T.: *See*—
Jarret, Bertrand; Cordier, Rose; and Buffa, Gerard, 4,504,975, Cl. 455-608.000.

Lillibridge, Harold R., to Champion International Corporation. Method and apparatus for scoring and folding envelopes. 4,504,260, Cl. 493-249.000.

Lillie, Terrance L.: *See*—
Couper, Robert A.; Lillie, Terrance L.; and Sera, Kiyoshi, 4,504,828, Cl. 340-735.000.

Lindberg, Bertil J.; and Elmefjall, Bernt C. G., to Byggnads-& Industriservice AB Binab. Method for compacting compactable soils by vibration. 4,504,176, Cl. 405-271.000.

Lindberg, John E., to Combustion Control Developments Ltd. Engine combustion control system and method employing condensation of some exhaust gas. 4,503,813, Cl. 123-25.00E.

Linde Aktiengesellschaft: *See*—
Backe, Wolfgang; Weingarten, Franz; and Murrenhoff, Hubertus, 4,503,674, Cl. 60-448.000.

Lindenmuller, Johann, to Autelca AG. Folding machine. 4,504,259, Cl. 493-23.000.

Lindner, Horst J.; Ufer, Peter P.; Heck, Klaus; and Schmoger, Gerhard, to Audi Nsu Auto Union. Method and apparatus for electrochemical machining. 4,504,370, Cl. 204-129.100.

Lings, Barry W., to Rolls-Royce Limited. Stator vane for a gas turbine engine. 4,504,189, Cl. 415-115.000.

Linguenheld, Louis; and Soula, Gerard, to Rhone-Poulenc Industries. Novel polyoxaalkyl aminoalcohols. 4,504,682, Cl. 564-480.000.

Linnik, Ronald L.: *See—*
Bennison, Stewart; and Linnik, Ronald L., 4,504,183, Cl. 414-412.000.

Lipowski, Stanley A., to Diamond Shamrock Chemicals Company. Aluminum salts of aromatic sulfonic acids formaldehyde condensates. 4,504,316, Cl. 106-90.000.

Lippitt, Maxwell W., Jr.; and Nuckols, Marshall L., to United States of America, Navy. Membrane valve for dry diver's apparel. 4,503,565, Cl. 2-2.10R.

Littelfuse, Inc.: *See—*
Chapin, Howard R.; and Gurley, Arnold E., 4,504,697, Cl. 174-52.00R.

Litton Resources Systems, Inc.: *See—*
Farris, Richard C.; and Diaz, Mario J., 4,503,929, Cl. 181-118.000.

Litton Systems, Inc.: *See—*
Levie, Stephen A.; and Taylor, William E., 4,504,767, Cl. 315-101.000.

Liu, Ping Y., to General Electric Company. Polycarbonate resin mixtures. 4,504,626, Cl. 525-133.000.

Livermore, David G. H.: *See—*
O'Callaghan, Cynthia H.; Ayres, Barry E.; Livermore, David G. H.; Newall, Christopher E.; and Weir, Niall G., 4,504,477, Cl. 514-203.000.

Lock, Brian E.: *See—*
Prusak, John J.; Lock, Brian E.; and Thorn, Joseph H., 4,503,806, Cl. 118-712.000.

Lockerby, W. Lee; and Guglielmo, Alfred R. Apparatus and method for processing crabs. 4,503,586, Cl. 17-48.000.

Lockheed Corporation: *See—*
Simpson, William E., Jr., 4,503,886, Cl. 137-596.000.

Loctite Corporation: *See—*
Lien, Samuel Q. S.; and Nakos, Steven T., 4,504,629, Cl. 525-288.000.

Loewe, Heinz: *See—*
Rosner, Manfred; Urbanietz, Josef; Loewe, Heinz; Duwel, Dieter; and Kirsch, Reinhard, 4,504,490, Cl. 514-483.000.

Logie, Frank M.; and Phillips, Ronald, to Lucas Industries Public Limited Company. Electromagnetic devices. 4,504,810, Cl. 335-261.000.

Logothetis, Eleftherios M.: *See—*
Kaiser, William J.; and Logothetis, Eleftherios M., 4,504,522, Cl. 427-103.000.

Lohn, Gerd, to Kaltenbach & Voight GmbH and Co. Dental handpiece set. 4,504,227, Cl. 433-131.000.

Lohr, Josef P.: *See—*
Lautenschlager, Hans-Heiner; Hilboll, Gerd; Friehe, Hugo; and Lohr, Josef P., 4,504,479, Cl. 514-252.000.

Lollar, Harvey N., Sr., to Kerr-McGee Chemical Corporation. Nailer for nailing at least one nail plate to a member. 4,504,006, Cl. 227-152.000.

L'Oreal: *See—*
Gueret, Jean-Louis M., 4,503,872, Cl. 132-88.500.
Lang, Gerard; and Malaval, Alain, 4,504,644, Cl. 527-201.000.

Loutaty, Roben: *See—*
Atlani, Martial; Loutaty, Roben; Wakselman, Claude; and Yacono, Charles, 4,504,287, Cl. 55-53.000.

Louvier, Yvon, to Synfina, S.A. Process and apparatus for redensifying thermoplastic resin foam. 4,504,436, Cl. 264-321.000.

Lowe, Henry E. Bulk storage building structure. 4,503,646, Cl. 52-198.000.

Lucas Industries PLC: *See—*
Burrage, Robert G., 4,504,905, Cl. 364-200.000.

Lucas Industries public limited company: *See—*
Farr, Glyn P. R., 4,503,876, Cl. 137-101.000.
Logie, Frank M.; and Phillips, Ronald, 4,504,810, Cl. 335-261.000.

Lucas, Jean; Goupillon, Jean-Francois; and Drouin, Bernard, to Centre National du Machinisme Agricole, du Genie Rural, des Eaux et des Forets. Method and apparatus for sustaining an oscillatory movement. 4,503,767, Cl. 100-214.000.

Lucchesi, Armand P., to J. C. Penney Company, Inc. Telephone having circuitry for reducing the audio output of the ringing signal. 4,504,701, Cl. 179-84.00T.

Luce, David A.: *See—*
Clark, Melville, Jr.; and Luce, David A., 4,503,745, Cl. 84-1.100.

Ludecke, Otto A.: *See—*
Stark, Terrence L.; and Ludecke, Otto A., 4,503,672, Cl. 60-286.000.

Lueker, Jonathan C.; and Zandonatti, Raymond A. Miniature thermomagnetic relay. 4,504,809, Cl. 335-208.000.

Lugscheider, Walter; Steipe, Othmar; Riegler, Ernst; and Zajicek, Ernst, to Voest-Alpine Aktiengesellschaft. Method for carrying out melting, melt-metallurgical and/or reduction-metallurgical processes in a plasma melting furnace as well as an arrangement for carrying out the method. 4,504,307, Cl. 75-10.00R.

Luhrs, Herman F.: *See—*
Dudley, Darnell T.; and Luhrs, Herman F., 4,504,425, Cl. 261-50.00A.

Lummus Company, The: *See—*
Chen, Jamin; Khonsari, Ali M.; and Suciu, George D., 4,504,364, Cl. 203-45.000.

Lupke, Gerd P. H.: *See—*
Lupke, Manfred A. A.; and Lupke, Gerd P. H., 4,504,206, Cl. 425-326.100.

Lupke, Manfred A. A.; and Lupke, Gerd P. H. Chainless mold drive for a corrugator or the like. 4,504,206, Cl. 425-326.100.

Lutze, Theodor: *See—*
Caspar, Wolfhard; and Lutze, Theodor, 4,503,848, Cl. 128-92.00D.

Luzzi, Antonio: *See—*
Beruto, Marco; Luzzi, Antonio; and Ramello, Piero, 4,504,572, Cl. 430-264.000.

Lyons, James E.; Suld, George; and Shinn, Robert W., to Suntech, Inc. Catalytic process for the conversion of toluene to equimolar amounts of phenyl acetate and methylene diacetate. 4,504,672, Cl. 560-131.000.

M/A-Com Linkabit, Inc.: *See—*
Gilhousen, Klein S., 4,504,925, Cl. 364-900.000.

M.A.N. Roland Druckmaschinen Aktiengesellschaft: *See—*
Herzel, Joachim; Simeth, Claus; Mitze, Rudolf; and Ortner, Robert, 4,503,771, Cl. 101-247.000.

Maaz, Gunther, to Sartorius GmbH. Electromagnetic force-compensating balance. 4,503,923, Cl. 177-212.000.

Mabon, John D.: *See—*
Edwards, Michael F.; and Mabon, John D., 4,504,095, Cl. 301-63.00R.

Maccaferri, Marco A.: *See—*
Cantrell, Daniel V.; Bryant, Herman G., Jr.; Jones, Robert L.; Maccaferri, Marco A.; and McDaniel, William M., 4,503,869, Cl. 131-336.000.

MacChesney, John B.; and O'Connor, Paul B., to AT&T Bell Laboratories. Optical fiber fabrication method. 4,504,299, Cl. 65-3.120.

MacInnes, Hugh; Meyer, Jon A.; Johnston, Andrew E.; and Fort, John W., Jr., to Roto-Master, Inc. Turbocharger method of operation and turbine housing therefor. 4,504,187, Cl. 415-1.000.

Mackay, Robert D., to AT&T Technologies, Inc. Low-insertion force method of assembling a lead and a substrate. 4,503,609, Cl. 29-843.000.

Mackey, Phillip J.; and Bailey, J. Barry W., to Noranda Inc. Process and apparatus for continuous converting of copper and non-ferrous mattes. 4,504,309, Cl. 75-72.000.

Macklin, John J.; Silfvast, William T.; and Wood, Obert R., II, to AT&T Bell Laboratories. Low voltage operation of arc discharge devices. 4,504,955, Cl. 372-76.000.

MacNair, Leonard I.; and Fishlock, Gary, to Metal Box p.l.c. Dispensing valve assembly for a pressurized container. 4,503,999, Cl. 222-402.160.

Macpac Products (N.Z.) Limited: *See—*
Hall, Robert E., 4,504,002, Cl. 224-211.000.

Mader, Herbert: *See—*
Voigt, Hartmut; Muck, Karl-Friedrich; Bar, Helmut; Mader, Herbert; Burg, Karlheinz; and Sextro, Gunter, 4,504,670, Cl. 549-347.000.

Madras, Peter N., to New England Deaconess Hospital. Small diameter vascular bypass and method. 4,503,568, Cl. 3-1.400.

Maekawa, Kouzi: *See—*
Miyakawa, Nobuhiro; Fujii, Masanori; and Maekawa, Kouzi, 4,504,562, Cl. 430-106.600.

Maetani, Teruo; Miyoshi, Ryoichi; Nahara, Yukinori; Kawazoe, Yasuyuki; and Hamada, Taizo, to Daikin Kogyo Co., Ltd. Dental casting. 4,504,228, Cl. 433-199.000.

Mahaffey, Donald H. Lightweight composite building module. 4,503,648, Cl. 52-227.000.

Majewski, Lawrence M., to Rockwell International Corporation. Roller retainer for brake assembly. 4,503,953, Cl. 188-330.000.

Maki, Yoshihiro: *See—*
Oaku, Takaaki; Maki, Yoshihiro; and Hokazono, Yasuzi, 4,504,312, Cl. 75-244.000.

Makino, Naonori; Horie, Seiji; Kawamura, Kouichi; and Sato, Hideo, to Fuji Photo Film Co., Ltd. Disazo compounds and photoconductive composition as well as electrophotographic light sensitive element containing the same. 4,504,559, Cl. 430-58.000.

Makita Electric Works, Ltd.: *See—*
Fushiya, Fusao; and Miyamoto, Kazuyuki, 4,503,736, Cl. 81-55.000.
Fushiya, Fusao; and Iwatuki, Takao, 4,504,769, Cl. 318-345.00H.

Makusij, Andrew J.: *See—*
Kessler, David R.; Beiswenger, David W.; and Makusij, Andrew J., 4,503,826, Cl. 123-470.000.

Malaval, Alain: *See—*
Lang, Gerard; and Malaval, Alain, 4,504,644, Cl. 527-201.000.

Malchow, Gregory L., to Whirlpool Corporation. Enclosure structure with double-acting hinge mechanism having interlocking pivotal latch. 4,503,584, Cl. 16-232.000.

Malinowski, Christopher: *See—*
Gillessen, Klaus; Mischel, Peter; and Malinowski, Christopher, 4,504,740, Cl. 250-578.000.

Mallen-Herrero, Jose ; and Leroy, Daniel, to Compagnie de Construction Mecanique Sulzer. Hydraulic motor and hydrostatic power transmission using such motor. 4,503,928, Cl. 180-308.000.

Mallinckrodt, Inc.: *See—*
Van Duzee, Barry F.; and Degenhardt, Charles R., 4,504,462, Cl. 424-1.100.
Van Duzee, Barry F., 4,504,463, Cl. 424-1.100.

Mancinelli, Anthony R.: *See—*
Mancinelli, Ralph A.; and Mancinelli, Anthony R., 4,503,628, Cl. 36-58.600.

Mancinelli, Ralph A.; and Mancinelli, Anthony R. Shoe insert. 4,503,628, Cl. 36-58.600.
Mandrin, Charles, to Sulzer Brothers Limited. Method and plant for obtaining deuterium-enriched water. 4,504,460, Cl. 423-580.000.
Mani, Krishnamurthy N.; and Chlanda, Frederick P., to Allied Corporation. Electrodialytic water splitting process and apparatus for conversion of alkali metal sulfate values derived from spent rayon spin baths. 4,504,373, Cl. 204-180.00P.
Mannesmann Tally Corporation: *See*—
Whitaker, C. Gordon, 4,503,768, Cl. 101-93.040.
Manning, Bennett W.; Slechta, Leo J., Jr.; and Wen, Kuo Y., to Sperry Corporation. High speed data base search system. 4,504,907, Cl. 364-200.000.
Manville Service Corporation: *See*—
Sherman, Earle C., 4,503,659, Cl. 53-491.000.
Manzer, Hans, to Siemens Aktiengesellschaft. Tank system for cold fixing a toner powder. 4,503,625, Cl. 34-78.000.
Marathon Oil Company: *See*—
Argabright, Perry A.; and Rhudy, John S., 4,503,909, Cl. 166-252.000.
Norton, Charles J., 4,503,912, Cl. 166-295.000.
Plummer, Mark A., 4,504,378, Cl. 208-108.000.
Marconi Company Limited, The: *See*—
Wisbey, Philip H., 4,504,758, Cl. 310-313.00R.
Marcus, Johannes W.: *See*—
Smit, Arie; and Marcus, Johannes W., 4,503,978, Cl. 211-13.000.
Mark, Victor, to General Electric Company. Copolyester-carbonate resins. 4,504,649, Cl. 528-176.000.
Markem Corporation: *See*—
Baldvins, Jon O.; and Puleo, Joseph, Jr., 4,504,565, Cl. 430-138.000.
Markowitz, Harold T.; Rueter, John C.; and Syring, Gary J., to Medtronic, Inc. Device for determining the pacing modality of an artificial cardiac pacemaker. 4,503,858, Cl. 128-419.0PT.
Markus, Gerardus A., to BS&B Engineering Company Inc. Fuel inlet assemblies for fuel reactors. 4,504,213, Cl. 431-116.000.
Marmon Group, Inc., The: *See*—
Alongi, C. J.; Miller, Jack L.; and Radzik, William W., 4,504,967, Cl. 381-65.000.
Mars Incorporated: *See*—
Chittleborough, Michael, 4,503,961, Cl. 194-1.00C.
Marsella, John R. Test probe. 4,504,780, Cl. 324-72.500.
Marsh, Andrew: *See*—
Heidmann, Kurt R.; and Marsh, Andrew, 4,503,947, Cl. 188-72.800.
Marsh, Richard L.; and Wetzel, Robert E., to Dayco Corporation. Belt construction and method of making same 4,504,342, Cl. 156-138.000.
Marshall, Albert H.: *See*—
Bond, Gary M.; and Marshall, Albert H., 4,504,232, Cl. 434-11.000.
Marshall, Frederick P.: *See*—
Boik, Elmer J.; and Marshall, Frederick P., 4,504,009, Cl. 229-5.500.
Marshall, G. June; and Snyder, Stephen J., to University of Southern California by G. June Marshall, a part interest. Solution for surgical irrigation. 4,504,493, Cl. 514-738.000.
Martech International: *See*—
Miller, Clyde; Hunt, Joe; and Wagner, Mark, 4,504,857, Cl. 358-99.000.
Martens, Gerhard: *See*—
Schippers, Heinz; Lenk, Erich; Martens, Gerhard; Mayer, Manfred; Pieper, Werner; and Putsch, Siegfried, 4,504,021, Cl. 242-18.100.
Martin, Douglas S., to Universal Dispensing Systems, Inc. Trigger sprayer. 4,503,998, Cl. 222-341.000.
Martin, Eugene G., to Victor F. Weaver Holding Co., Inc. Automatic poultry breast processing machine and method. 4,503,587, Cl. 17-52.000.
Martin, Kelsey, to Medical Designs, Inc. Derotation leg brace. 4,503,846, Cl. 128-80.00C.
Martin, Lawrence L.; Worm, Manfred; and Crichlow, Charles A., to Hoechst-Roussel Pharmaceuticals Inc. 4-Phenyl-1,3-benzodiazepines. 4,504,680, Cl. 564-265.000.
Martin, William A.; and Lee, James K., to Eastman Kodak Company. Multifunction electromagnetic actuator and camera control apparatus emloying same. 4,504,132, Cl. 354-195.100.
Maruyama, Shinichi: *See*—
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Marvin Glass & Associates: *See*—
Kulesza, Ralph J.; Disko, Harry; and Gibbons, Dennis R., 4,504,239, Cl. 446-95.000.
Marzocchi, Alfred: *See*—
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Maschinenfabrik Gehring GmbH & Co KG: *See*—
Grimm, Hans; and Richter, Gunter, 4,504,917, Cl. 364-474.000.
Maschinenfabrik Muller-Weingarten AG: *See*—
Hacker, Harald; Amann, Ulrich; Geisinger, Karl; and Engelhardt, Hans, 4,503,766, Cl. 100-207.000.
Maslanka, Harald. High frequency surgical snare electrode. 4,503,855, Cl. 128-303.150.
Masonite Corporation: *See*—
Prior, William L.; and Sargeant, William C., 4,504,555, Cl. 428-689.000.
Master, Raj N.: *See*—
Tummala, Rao R.; and Master, Raj N., 4,504,340, Cl. 156-89.000.
Masters, William E. Combination flotation storage and seating structures for boats. 4,503,799, Cl. 114-363.000.
Masuda, Akira: *See*—
Miyaki, Masahiko; Matsumura, Toshimi; Masuda, Akira; Sumitani, Sinya; Hasegawa, Takashi; and Hayakawa, Takahiro, 4,503,821, Cl. 123-357.000.
Nakamura, Tetsuya; Hobo, Nobuhito; Tsuzuki, Yoshihiko; Suzuki, Yutaka; Haseda, Satoshi; and Masuda, Akira, 4,503,830, Cl. 123-501.000.
Masuda, Michio, to Hitachi, Ltd. Color image pickup device. 4,504,854, Cl. 358-44.000.
Mathey, Francois: *See*—
Breque, Anne; Muller, Georges; Bonnard, Hubert; Mathey, Francois; and Savignac, Philippe, 4,504,683, Cl. 568-12.000.
Mathographics Research Corporation: *See*—
Jarvis, Arthur B., 4,504,234, Cl. 434-188.000.
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Matsuda, Hideaki; and Saheki, Takasi, to Okura Kogyo Kabushiki Kaisha. Process for producing plastic concrete. 4,504,318, Cl. 106-90.000.
Matsuda, Ikuo: *See*—
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Matsuda, Keiji: *See*—
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Matsuhisa, Hiroaki: *See*—
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Matsui, Fujio: *See*—
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Matsui, Kanenobu; Uchiumi, Shinichiro; Iwayama, Akira; and Umezu, Takashi, to Ube Industries, Ltd. Process for producing an acetal. 4,504,421, Cl. 260-465.600.
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Matsumoto, Fumio: *See*—
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Matsumoto, Hiroyuki; and Kato, Toshio, to Sony Corporation. Solid state image sensor with over-flow control. 4,504,848, Cl. 357-24.000.
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Matsumura, Kaname; and Komai, Takahiko, to Mitsuboshi Belting Ltd. Variable V-belt. 4,504,256, Cl. 474-250.000.
Matsumura, Toshimi: *See*—
Miyaki, Masahiko; Matsumura, Toshimi; Masuda, Akira; Sumitani, Sinya; Hasegawa, Takashi; and Hayakawa, Takahiro, 4,503,821, Cl. 123-357.000.
Matsuo, Kenzaburo: *See*—
Ida, Jinsei; Fujita, Tsutomu; Matsuo, Kenzaburo; Higuchi, Fumio; and Tamura, Mitsuo, 4,503,596, Cl. 29-568.000.
Matsuo, Masashi; Itoh, Katsuji; Hayashi, Takao; and Oda, Yoshio, to Asahi Glass Company Ltd. Stainproofing agent and process for its preparation. 4,504,401, Cl. 252-8.750.
Matsuoka, Masaru: *See*—
Esho, Sotaro; Itoh, Masaki; and Matsuoka, Masaru, 4,504,548, Cl. 428-426.000.
Matsushita Electric Industrial Co., Ltd.: *See*—
Fujishita, Kazuo; Kaneko, Hideki; Ushirokajitani, Yoshiyuki; and Kanno, Tadao, 4,503,810, Cl. 122-13.00R.
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Mihara, Toshihiro; Kusuda, Takao; Noma, Koichi; and Taki, Hiromitsu, 4,504,218, Cl. 431-326.000.
Onodera, Hiromi; Wakabayashi, Noriaki; Yamada, Kiichiro; and Sugizaki, Yasushi, 4,504,750, Cl. 310-12.000.
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Tanaka, Shinichi; Matsuda, Ikuo; Hirose, Namio; and Kobayashi, Kazutsugu, 4,504,934, Cl. 369-18.000.
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Matsushita Electronics Corporation: *See*—
Gobara, Taku; and Misaki, Hirozumi, 4,504,795, Cl. 330-277.000.
Matsuura, Hitoshi; Yamazaki, Etsuo; and Sakurai, Hiroshi, to Fanuc Ltd. Method of sensing current position in position control system. 4,504,772, Cl. 318-603.000.
Mattel, Inc.: *See*—
Crain, Philip W.; and St. Pierre, Raymond M., 4,504,242, Cl. 446-429.000.
Mattes, Hans G.: *See*—
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Matthews, William E., to Phillips Petroleum Company. Removal of sedimentary constituents from liquids. 4,504,397, Cl. 210-804.000.
Matthys, Bernard A.: *See*—
Gillingham, Gary R.; Wahlquist, Fred H.; and Matthys, Bernard A., 4,504,293, Cl. 55-350.000.
Maurin, Suzanne M., to Societe Anonyme: Leisystem. Sail rolling and storing device. 4,503,797, Cl. 114-106.000.

Mayer, Manfred: *See—*
Schippers, Heinz; Lenk, Erich; Martens, Gerhard; Mayer, Manfred; Pieper, Werner; and Putsch, Siegfried, 4,504,021, Cl. 242-18.100.

Mazda Motor Corporation: *See—*
Fujii, Hiroshi; Okamoto, Akito; and Watanabe, Tuyoshi, 4,504,919, Cl. 364-478.000.

Mazeke, Herbert F.: *See—*
Duke, June T.; Mazeke, Herbert F.; and Prem, Dorothy C., 4,504,605, Cl. 523-201.000.

Mazis, Bernard, to Keystone Lighting Corporation. Fluorescent lamp system. 4,504,891, Cl. 362-219.000.

MB-80 Energy Corporation: *See—*
Filatovs, George J.; and McGinness, John E., 4,504,557, Cl. 429-192.000.

McAlister, George A. Animal herd management system. 4,503,808, Cl. 119-1.000.

McClelland, John R.; Wright, Wade S.; Diamond, Edward P.; Pryor, Leroy C.; and Olson, Douglas R., to Armco Inc. High temperature box annealing furnace. 4,504,957, Cl. 373-130.000.

McCombie, Stuart W.; Ganguly, Ashit K.; and Girijavallabhan, Viyyoor M., to Schering Corporation. 5R,6S,8R-6-(1-Hydroxyethyl)-2-(2-carbamoyloxyethylthio)-penem-3-carboxylic acid. 4,504,485, Cl. 514-192.000.

McCoy, Dale E.: *See—*
Chang, Robert C.; and McCoy, Dale E., 4,504,619, Cl. 524-524.000.

McDaniel, Max P.; and Johnson, Marvin M., to Phillips Petroleum Company. Ethylene polymers made from phosphate supported chromium catalyst. 4,504,638, Cl. 526-134.000.

McDaniel, William M.: *See—*
Cantrell, Daniel V.; Bryant, Herman G., Jr.; Jones, Robert L.; Maccaferri, Marco A.; and McDaniel, William M., 4,503,869, Cl. 131-336.000.

McDowell, Vaughn P. Loudspeaker system. 4,503,930, Cl. 181-145.000.

McGinness, John E.: *See—*
Filatovs, George J.; and McGinness, John E., 4,504,557, Cl. 429-192.000.

McGraw-Edison Company: *See—*
Strang, Donald P., 4,504,813, Cl. 336-216.000.

McGregor, Charles D.: *See—*
Payne, Errol G.; McGregor, Charles D.; and Uyeda, Tim M., 4,504,160, Cl. 400-196.100.

McIntyre, Donald J., to San/Bar Corporation. Brush assembly apparatus for cleaning cannons. 4,503,578, Cl. 15-104.165.

McIntyre, Randall S.: *See—*
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McJunkin Corporation: *See—*
Gall, Adam F.; and McJunkin, Howard P., Jr., 4,503,594, Cl. 29-157.00R.

McJunkin, Howard P., Jr.: *See—*
Gall, Adam F.; and McJunkin, Howard P., Jr., 4,503,594, Cl. 29-157.00R.

McKee, Donald H.: *See—*
Earle, Roland D.; and McKee, Donald H., 4,504,502, Cl. 426-293.000.

McKinney, Ronald J., to Du Pont de Nemours, E. I., and Company. Process for dimerizing acrylates to hexenedioates. 4,504,674, Cl. 560-202.000.

McMahan, William H.; and Holtman, Steve H., to American Laser Corporation. High speed switching power supply for a light controlled laser system. 4,504,951, Cl. 372-38.000.

McMahon, Maurice T.: *See—*
Goel, Prabhakar; and McMahon, Maurice T., 4,504,784, Cl. 324-73.00R.

Meacham, Thomas E., Jr., to Singer Company, The. Gas pressure regulator with under and over shut-off. 4,503,883, Cl. 137-458.000.

Mead, Theodore C.; and Wright, James H., to Texaco Inc. Urea dewaxing of naphthene oils. 4,504,376, Cl. 208-25.000.

Medical College of Wisconsin, Inc., The: *See—*
Froncisz, Wojciech; and Hyde, James S., 4,504,788, Cl. 324-316.000.

Medical Designs, Inc.: *See—*
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Medtronic, Inc.: *See—*
Markowitz, Harold T.; Rueter, John C.; and Syring, Gary J., 4,503,858, Cl. 128-419.0PT.

Meienhofer, Johannes A.: *See—*
Felix, Arthur M.; Gillessen, Dieter; Studer, Rolf; Meienhofer, Johannes A.; and Trzeciak, Arnold, 4,504,415, Cl. 260-112.50R.

Meier, Peter, to Micronel AG. Fan with electronically commutated direct-current motor. 4,504,751, Cl. 310-62.000.

Meinhardt, Heinrich; Berger, Alfons; and Zimmerman, Harald, to Triumph-Adler A.G. fur Buro und Informationstechnik. Method for destroying used carbon ribbon. 4,504,015, Cl. 241-3.000.

Melancon, Kurt C., to Minnesota Mining and Manufacturing Company. Latently-curable organosilicone release coating composition. 4,504,645, Cl. 528-15.000.

Melcher, Robert L.; and Wen, Sheree H., to International Business Machines Corporation. Laser drilling system utilizing photoacoustic feedback. 4,504,727, Cl. 219-121.0LB.

Melin, Per O. R.; and Trojnar, Jerzy A., to Ferring AB. Vasotocin derivatives. 4,504,469, Cl. 514-11.000.

Mello, William R., to Houdaille Industries, Inc. Tool detection system. 4,504,824, Cl. 340-680.000.

Melman, Paul: *See—*
Carlsen, W. John; and Melman, Paul, 4,504,121, Cl. 350-385.000.

Memphis State University: *See—*
Smith, John W., 4,504,282, Cl. 48-197.00R.

Mendehall, Robert L. Closed end drum asphaltic concrete recycle apparatus and method. 4,504,149, Cl. 366-4.000.

Mendenhall, Burke H. Disposable toothbrush. 4,503,871, Cl. 132-84.00B.

Mensink, Kornelis A.: *See—*
Boute, Willem; Wittkampf, Frederik H. M.; van Arragon, Gerrit W.; and Mensink, Kornelis A., 4,503,857, Cl. 128-419.0PG.

Meriaux, Michel: *See—*
Bichara, Michel; Koensgen, Jean-Pierre; Bodu, Michel; Meriaux, Michel; and Zimmermann, Jean-Pierre, 4,504,092, Cl. 299-5.000.

Merk, Werner: *See—*
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Mertens, Waldemar W.: *See—*
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Mery, Jean-Claude: *See—*
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Messerschmitt-Bolkow-Blohm Gesellschaft mit beschrankter Haftung: *See—*
Bruderle, Ernst; and Reindler, Albrecht, 4,504,912, Cl. 364-434.000.
Hofmann, Otto, 4,504,914, Cl. 364-456.000.

Metal Box p.l.c.: *See—*
MacNair, Leonard I.; and Fishlock, Gary, 4,503,999, Cl. 222-402.160.

Metallgesellschaft Aktiengesellschaft: *See—*
Doerges, Alexander; Schlauer, Johann; Kriebel, Manfred; and Hude, Anton, 4,504,449, Cl. 423-228.000.
Mulder, Jurgen; and Gutmann, Pedro, 4,504,356, Cl. 162-29.000.

Metrix Instrument Co.: *See—*
Sundt, Peter C., 4,504,932, Cl. 367-183.000.

Meunter, Bernard; and Gradeler, Eric, to Compagnie Generale de Constructions Telephoniques. Additional line coupling circuit to an intercom telephone set. 4,504,702, Cl. 179-99.00A.

Meyer, Howard E., to Heat Exchange and Transfer, Inc. Heat sealing apparatus. 4,504,352, Cl. 156-499.000.

Meyer, Jon A.: *See—*
MacInnes, Hugh; Meyer, Jon A.; Johnston, Andrew E.; and Fort, John W., Jr., 4,504,187, Cl. 415-1.000.

Meyer, Joseph; and Vinton, David J., to U.S. Philips Corporation. Method of forming a resist mask resistant to plasma etching. 4,504,574, Cl. 430-331.000.

Meyers, George; and Mueller, David C., to Garber Company, The. Nailpolish package. 4,503,975, Cl. 206-486.000.

Meyerson, Bernard S.: *See—*
Kuech, Thomas F.; and Meyerson, Bernard S., 4,504,331, Cl. 148-175.000.

Michel, Walter F. Space travel game. 4,504,061, Cl. 273-250.000.

Michigan Disposal, Inc.: *See—*
Tomyn, Walter W., 4,504,151, Cl. 366-156.000.

Mickey, Daniel A.: *See—*
Kniat, John; Kuhlberg, Joel F.; and Mickey, Daniel A., 4,504,030, Cl. 244-57.000.

Mickowski, John. Data analysis and display method for reciprocating equipment in industrial processes. 4,504,920, Cl. 364-550.000.

Micronel AG: *See—*
Meier, Peter, 4,504,751, Cl. 310-62.000.

Middendorp Electric Co. Pty. Ltd.: *See—*
Joseph, Beresford C., 4,504,742, Cl. 307-252.00N.

Miggels, Stephen G.: *See—*
Kuhn, Lowell L.; and Miggels, Stephen G., 4,503,749, Cl. 98-2.110.

Migua-Mitteldeutsche Gummi-und Asbestgesellschaft Hammerschmidt GmbH: *See—*
Schukolinski, Manfred, 4,504,170, Cl. 404-55.000.

Mihara, Toshihiro; Kusuda, Takao; Noma, Koichi; and Taki, Hiromitsu, to Matsushita Electric Industrial Co., Ltd. Ceramic burner plate. 4,504,218, Cl. 431-326.000.

Miisho, Kazuyuki: *See—*
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Mikami, Yukio: *See—*
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Miki, Yutaka; Kuroda, Masayuki; and Omori, Tetsumi, to NTN Toyo Bearing Company, Limited. Drive-axle bearing device for automobiles. 4,504,099, Cl. 384-543.000.

Miller, Clyde; Hunt, Joe; and Wagner, Mark, to Martech International. Gyro-compass positioning apparatus. 4,504,857, Cl. 358-99.000.

Miller, Ira: *See—*
Davies, Robert B.; Miller, Ira; and Dotson, Robert N., 4,504,928, Cl. 365-11.000.

Miller, Jack L.: *See—*
Alongi, C. J.; Miller, Jack L.; and Radzik, William W., 4,504,967, Cl. 381-65.000.

Miller, James A.: *See—*
Hargenrader, Richard J.; and Miller, James A., 4,503,917, Cl. 173-147.000.

Miller, Jesse D., Jr.; Tshudy, James A.; and Unruh, Ralph E., to Armstrong World Industries, Inc. Durable, low-maintenance flooring tile. 4,504,523, Cl. 427-197.000.

Miller, Kenneth F.; and Belfoure, Edward, to General Electric Company. Copolyester-carbonate blends exhibiting improved processability. 4,504,634, Cl. 525-439.000.

Miller, Kurt R.: *See*—
Riihiluoma, Clayton; and Miller, Kurt R., 4,504,060, Cl. 273-241.000.
Miller, Michael C. Connecting structure. 4,504,168, Cl. 403-353.000.
Miller, Roscoe E. Enema apparata improvements relating to double contrast studies. 4,504,270, Cl. 604-275.000.
Mills, Kenneth R., to Phillips Petroleum Company. Treating polymers of ethylene. 4,504,615, Cl. 524-291.000.
Minaki, Toshihiro: *See*—
Hara, Sadao; Moritani, Hiroaki; Kaga, Hisashi; Minaki, Toshihiro; Shibata, Kenichi; Ogawa, Junichi; and Umino, Kaoru, 4,504,527, Cl. 427-318.000.
Minami, Kazuaki: *See*—
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Mines de Potasse d'Alsace S.A.: *See*—
Bichara, Michel; Koensgen, Jean-Pierre; Bodu, Michel; Meriaux, Michel; and Zimmermann, Jean-Pierre, 4,504,092, Cl. 299-5.000.
Minnesota Mining and Manufacturing Company: *See*—
Antonson, David L., 4,504,351, Cl. 156-391.000.
Beruto, Marco; Luzzi, Antonio; and Ramello, Piero, 4,504,572, Cl. 430-264.000.
Melancon, Kurt C., 4,504,645, Cl. 528-15.000.
Minolta Camera Kabushiki Kaisha: *See*—
Nakai, Masaaki; Kogure, Yasuzi; Sahara, Masayoshi; and Kobori, Toshio, 4,504,133, Cl. 354-266.000.
Miranker, Glen S.: *See*—
Cook, Peter W.; Hsieh, Hung-Hui; and Miranker, Glen S., 4,504,924, Cl. 364-787.000.
Misaki, Hirozumi: *See*—
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Mischel, Peter: *See*—
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Misenheimer, James R., to Celanese Corporation. Card web strength test. 4,503,704, Cl. 73-159.000.
Mita Industrial Co., Ltd.: *See*—
Miyakawa, Nobuhiro; Fujii, Masanori; and Maekawa, Kouzi, 4,504,562, Cl. 430-106.600.
Mitchell, Terence N.: *See*—
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Mitsubishi Denki Kabushiki Kaisha: *See*—
Hamano, Isao, 4,503,719, Cl. 74-7.00E.
Hirano, Ryoichi; Namizaki, Hirofumi; Susaki, Wataru; and Tanaka, Toshio, 4,504,328, Cl. 148-171.000.
Iwaki, Yoshiyuki; Imori, Hideo; and Gotou, Hitoshi, 4,504,752, Cl. 310-68.00R.
Nomura, Masami, 4,503,938, Cl. 187-29.00R.
Takabe, Katsunori, 4,503,941, Cl. 187-29.00R.
Ukai, Jun; Segawa, Hirohisa; and Ando, Haruki, 4,504,728, Cl. 219-125.100.
Watanabe, Eiki, 4,503,940, Cl. 187-29.00R.
Mitsubishi Jukogyo Kabushiki Kaisha: *See*—
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Mitsubishi Petrochemical Co., Ltd.: *See*—
Yui, Hiroshi; Sobajima, Yoshihiro; Higashide, Osamu; Imamura, Tsuyoshi; Okamura, Michiya; and Hattori, Satoru, 4,504,617, Cl. 524-426.000.
Mitsubishi Rayon Co. Ltd.: *See*—
Kishida, Kazuo; Sasaki, Isao; and Mori, Hiroshi, 4,504,608, Cl. 523-444.000.
Mitsubishi Yuka Fine Chemicals Co., Ltd.: *See*—
Higaki, Yoshikazu; and Omori, Hiroyuki, 4,504,423, Cl. 260-465.700.
Mitsuboshi Belting Ltd.: *See*—
Matsumura, Kaname; and Komai, Takahiko, 4,504,256, Cl. 474-250.000.
Tanaka, Hideaki; Fujita, Kunihiro; and Ushiroda, Mitsuhiro, 4,504,258, Cl. 474-263.000.
Mittelhauser, Bernhard. Rear view mirror for vehicles with potentiometric angular position detectors. 4,504,117, Cl. 350-636.000.
Mittermeier, Walter, to Dr. Ing. h.c.F. Porsche A.G. Hydraulic chain tensioner. 4,504,251, Cl. 474-110.000.
Mitze, Rudolf: *See*—
Herzel, Joachim; Simeth, Claus; Mitze, Rudolf; and Ortner, Robert, 4,503,771, Cl. 101-247.000.
Miura, Kunio; Hasebe, Koshi; Ono, Takashi; Akutsu, Kazushi; Ohyama, Shinji; and Minami, Kazuaki, to Nippondenso Co., Ltd. Electronic navigator for automotive vehicles. 4,504,913, Cl. 364-449.000.
Miwa, Hiroshi: *See*—
Kuwajima, Teruaki; Miwa, Hiroshi; Kida, Katsuaki; and Ishikura, Shinichi, 4,504,609, Cl. 523-501.000.
Miwa, Takamichi: *See*—
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Miyakawa, Nobuhiro; Fujii, Masanori; and Maekawa, Kouzi, to Mita Industrial Co., Ltd. One-component type magnetic developer comprises particles of cubic magnetite. 4,504,562, Cl. 430-106.600.
Miyake, Takashi: *See*—
Ikemoto, Kazuhito; Terakura, Yukio; and Miyake, Takashi, 4,503,957, Cl. 192-4.00C.
Miyaki, Masahiko; Matsumura, Toshimi; Masuda, Akira; Sumitani, Sinya; Hasegawa, Takashi; and Hayakawa, Takahiro, to Nippondenso Co., Ltd. Apparatus and method for controlling amount of fuel injected into engine cylinders. 4,503,821, Cl. 123-357.000.
Miyamoto, Kazuyuki: *See*—
Fushiya, Fusao; and Miyamoto, Kazuyuki, 4,503,736, Cl. 81-55.000.
Miyashita, Tsuneo; Sakamoto, Noboru; and Fukuyo, Hiroshi, to Nippon Kokan Kabushiki Kaisha. Method of producing agglomerates. 4,504,306, Cl. 75-3.000.
Miyauchi, Sakae: *See*—
Hasegawa, Mineo; Yoshida, Kazuya; Miyauchi, Sakae; and Terazono, Masami, 4,504,583, Cl. 435-206.000.
Miyazaki, Kenichi: *See*—
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Miyazaki, Tomio: *See*—
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Miyoshi, Ryoichi: *See*—
Maetani, Teruo; Miyoshi, Ryoichi; Nahara, Yukinori; Kawazoe, Yasuyuki; and Hamada, Taizo, 4,504,228, Cl. 433-199.000.
Miyoshi, Takahito; Okutu, Toshimitu; and Fujiyama, Masaaki, to Fuji Photo Film Co., Ltd. Magnetic recording medium having a subbing layer of amorphous saturated polyesters. 4,504,542, Cl. 428-336.000.
Mobil Oil Corporation: *See*—
Chu, Chin-Chiun, 4,504,594, Cl. 502-184.000.
Clinton, John D.; and Reusswig, Gerhard H., 4,504,172, Cl. 405-217.000.
Forbus, Nancy P.; and Kaeding, Warren W., 4,504,690, Cl. 585-466.000.
Haddad, James H.; and Schatz, Klaus W., 4,504,291, Cl. 55-319.000.
Hartman, Kathy J.; and Shu, Winston R., 4,503,911, Cl. 166-272.000.
Hsia, Chung-hweng; Owen, Hartley; and Wright, Bernard S., 4,504,691, Cl. 585-519.000.
Schmitt, Kirk D., 4,504,622, Cl. 525-61.000.
Shu, Paul; and Yan, Tsoung Y., 4,504,377, Cl. 208-75.000.
Shu, Winston R., 4,503,910, Cl. 166-263.000.
Tabak, Samuel A.; Wright, Bernard S.; and Owen, Hartley, 4,504,693, Cl. 585-520.000.
Mockett, Paul M.: *See*—
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Modisette Incorporated: *See*—
Modisette, Jerry L., 4,504,285, Cl. 55-16.000.
Modisette, Jerry L., to Modisette Incorporated. Separation of condensible vapors from gas mixtures. 4,504,285, Cl. 55-16.000.
Modular Engineering Corporation: *See*—
Lewis, Lloyd J., 4,503,982, Cl. 211-184.000.
Moerchen, John M.: *See*—
Kurth, Charles W.; and Moerchen, John M., 4,504,497, Cl. 426-130.000.
Moeremans, Guy, to Regie Nationale des Usines Renault. Ball-and-socket joint, especially for mounting the casing of an orientable rear-view mirror. 4,504,165, Cl. 403-129.000.
Moermond, Dennis L., personal representative: *See*—
Moermond, Donald I., deceased; Moermond, Dennis L., personal representative; and Moermond, Raymond A., personal representative, 4,504,812, Cl. 336-84.00C.
Moermond, Donald I., deceased; Moermond, Dennis L., personal representative; and Moermond, Raymond A., personal representative. Spherical transformer apparatus. 4,504,812, Cl. 336-84.00C.
Moermond, Raymond A., personal representative: *See*—
Moermond, Donald I., deceased; Moermond, Dennis L., personal representative; and Moermond, Raymond A., personal representative, 4,504,812, Cl. 336-84.00C.
Mogi, Fumio: *See*—
Otani, Sugio; Gomi, Shimpei; and Mogi, Fumio, 4,504,455, Cl. 423-447.600.
Moinet, Gerard H.; Dostert, Philippe L.; and Bourgery, Guy R., to Delalande S.A. 3-Hydroxyalkyl-3,4-dihydro-1-substituted isoquinolines. 4,504,663, Cl. 546-144.000.
Moizumi, Ken'ichi, to Tokyo Shibaura Denki Kabushiki Kaisha. Control system for a split type air-conditioner. 4,503,686, Cl. 62-467.000.
Moji, Yukimori, to Boeing Company, The. Method for sealing an aluminum oxide film. 4,504,325, Cl. 148-6.200.
Molded Fiber Glass Companies: *See*—
Mollman, Robert E.; and Silva, Ralph, 4,504,431, Cl. 264-105.000.
Molex Incorporated: *See*—
Sampson, Stephen A.; and Olson, Thor F., 4,503,611, Cl. 29-845.000.
Molins Limited: *See*—
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Molins PLC: *See*—
Boult, George W.; and King, Richard R., 4,503,866, Cl. 131-84.00C.
Coyte, Raymond G., 4,503,868, Cl. 131-282.000.
Moller, Dieter; and Boert, Konrad, to Dierks & Sohne GmbH & Co. KG. Mixing and/or kneading apparatus. 4,504,152, Cl. 366-188.000.
Mollman, Robert E.; and Silva, Ralph, to Molded Fiber Glass Companies. Electrically conductive fiber glass articles and sheets. 4,504,431, Cl. 264-105.000.
Molloy, R. Michael; and Debono, Manuel, to Eli Lilly and Company. Glycopeptide derivatives. 4,504,467, Cl. 424-118.000.
Monaghan, George J., to Energy Fibers Int'l. Corp. High quality mineral wool. 4,504,544, Cl. 428-357.000.
Monsanto Company: *See*—
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Montedison S.p.A.: *See*—
Cecere, Mirella; Gozzo, Franco; and Signorini, Ernesto, 4,504,303, Cl. 71-76.000.
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Moody, Gerald W. Apparatus for cutting ceramic tile. 4,504,003, Cl. 225-96.500.
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Evers, William J.; Stork, Gilbert; Mookherjee, Braja D.; and Heinsohn, Howard H., Jr., 4,504,398, Cl. 252-8.600.
Moore, Candace X.: *See*—
Arrhenius, Gustaf O.; Goldstein, Michael L.; and Moore, Candace X., 4,503,838, Cl. 126-263.000.
Moore, Dwane L., to Kreonite, Inc. Film processor transport roller end plug. 4,504,005, Cl. 226-190.000.
Moore, John F., to EMI Limited. Computerized tomography. 4,504,962, Cl. 378-19.000.
Moore Special Tool Co., Inc.: *See*—
Romano, Salvatore, 4,504,064, Cl. 277-12.000.
Moore, Victor S.; and Leininger, Joel C., to International Business Machines Corporation. Binary logic structure employing programmable logic arrays and useful in microword generation apparatus. 4,504,904, Cl. 364-200.000.
Morand, Joseph E. D. M., to Norman Wade Company Limited. Two piece clamp binder. 4,503,979, Cl. 211-45.000.
Morgan, Avery A., to Honeywell Inc. Ring laser gyro system. 4,504,146, Cl. 356-350.000.
Morgan, Patsy A.: *See*—
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Morgan, Richard P. Can flange trimming. 4,503,738, Cl. 83-146.000.
Morgan, William E.; and Morgan, Patsy A. Arm restraint for blood sampling. 4,503,849, Cl. 128-133.000.
Mori, Hiroshi: *See*—
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Morin, Gerard, to Societe Anonyme D.B.A. Method and apparatus for the manufacture of a ball joint and ball joint obtained thus. 4,504,166, Cl. 403-147.000.
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Moritani, Hiroaki: *See*—
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Morton, William P. Fluorescent vapor fumes for use with a self-contained fingerprinting kit. 4,504,408, Cl. 252-301.160.
Motorola Inc.: *See*—
Cygan, Lawrence F.; Olivera, Raul; and Pottle, John F., 4,504,886, Cl. 361-386.000.
Davies, Robert B.; Miller, Ira; and Dotson, Robert N., 4,504,928, Cl. 365-11.000.
Garay, Oscar M.; Siwiak, Kazimierz; and Balzano, Quirino, 4,504,834, Cl. 343-749.000.
Smith, Michael D.; Olesin, Andrew S.; and Whatley, Roger A., 4,504,747, Cl. 307-475.000.
MotorTech, Inc.: *See*—
Yunick, Henry, 4,503,833, Cl. 125-545.000.
Motov, David L.; Tjurkina, Ljudmila P.; Godneva, Maria M.; Kolesnikova, Nina I.; Yakusheva, Galina G.; Ivanovich, Metelkin A., deceased; and by Fedorovna, Chibisova N., administrator. Leather tanning agent and process for making same. 4,504,271, Cl. 8-94.250.
Mott, Philip J., to Borg-Warner Corporation. Revised spline drive for metal belt CVT. 4,504,246, Cl. 474-8.000.
Mottate, Tatsuo, to Nippon Thompson Co. Ltd. Return hole of a roller bearing for endless linear motion. 4,504,097, Cl. 308-6.00C.
Mouille, Rene L., to Societe Nationale Industrielle Aerospatiale. Helicopter rotor with articulation means integrated in the root of the blade. 4,504,193, Cl. 416-140.000.
Mount, Gordon L.; Bandukwalla, Phiroze; and Mulugeta, Jarso, to Carrier Corporation. Control apparatus for centrifugal compressor. 4,503,684, Cl. 62-115.000.
Mouradian, William H., to Howmedica, Inc. Prosthetic nail. 4,503,847, Cl. 128-92.0BC.
Mouser, Curtis A.; Roberts, Mark G.; Haas, Daniel R.; and Lancaster, Patrick R., III, to Lantech, Inc. Feedback controlled stretch wrapping apparatus and process. 4,503,658, Cl. 53-399.000.
Moyer, Harold W., to AT&T Bell Laboratories. Solder preform stabilization for lead frames. 4,504,427, Cl. 264-25.000.
MTS Systems Corporation: *See*—
Brovold, Thomas E., 4,503,888, Cl. 137-625.650.
Muck, Karl-Friedrich: *See*—
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Mukaiyama, Megumi: *See*—
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Mulder, Jurgen; and Gutmann, Pedro, to Metallgesellschaft Aktiengesellschaft. Continuous process of removing silica from spent pulping liquors. 4,504,356, Cl. 162-29.000.
Muller, Georges: *See*—
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Munk, Edmund; and Haas, Herbert, to Werzalit Pressholzwerk J. F. Werz Jr. KG. Method of hot pressing a synthetic-resin laminate. 4,504,347, Cl. 156-245.000.
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Murasugi, Takashi: *See*—
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Murata, Yoshifumi; Igi, Keishiro; Narukawa, Hiroshi; Uetsuki, Masao; Bando, Satoshi; Kawai, Shuji; and Shirano, Kenji, to Kuraray Co., Ltd. Polyester, adhesives comprising the same, and laminates and laminated hollow vessels made thereof. 4,504,531, Cl. 428-35.000.
Murayama, Naohiro: *See*—
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Murphy, Edward J.: *See*—
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Murphy, Gerald J.; Pilie', Walter E.; and Garaudy, Glenn, to Autocon, Incorporated. Gas high-low pressure control apparatus. 4,503,875, Cl. 137-83.000.
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Muse, Ralph F., to Hubbard Company. Partially stiffened extensible waistband structure. 4,503,567, Cl. 2-237.000.
Mushell, Joshua. Coin-operated ticket release mechanism. 4,503,962, Cl. 194-1.00G.
Mussallem, Charles S., Jr., to No-Muv Corporation, Inc. Rug underlay comprising open lattice with partially fused needle punched fiber layers. 4,504,537, Cl. 428-167.000.
Mussallem, Charles S., Jr., to No-Muv Corporation, Inc. Rug underlay of fibers needled into mesh. 4,504,538, Cl. 428-167.000.
Musschoot, Albert, to General Kinematics Corporation. Furnace ash air seal. 4,503,783, Cl. 110-165.00R.
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Nabisco Brands, Inc.: *See*—
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Nadler, Morton. Process and device for the automatic segmentation of a scanned image in an image pattern recognition system. 4,504,971, Cl. 382-26.000.

Nagano, Katsuyuki; Takahashi, Yasushi; Takasaki, Yoshitaka; and Tanaka, Mitsuo, to Hitachi, Ltd. Time domain multiplexer. 4,504,943, Cl. 370-79.000.

Nagano, Teruo: *See*—
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Nagao, Toshiaki: *See*—
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Nagaoka, Yoshimichi, to Victor Company of Japan, Ltd. Miniature type tape cassette. 4,504,876, Cl. 360-94.000.

Nagase, Yasuo: *See*—
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Nagasoe, Seiichi: *See*—
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Nakagawa, Toyoaki, to Nissan Motor Company, Limited. Fuel injection quantity sensing apparatus for an internal combustion engine. 4,503,820, Cl. 123-357.000.

Nakaguchi, Osamu: *See*—
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Nakai, Masaaki; Kogure, Yasuzi; Sahara, Masayoshi; and Kobori, Toshio, to Minolta Camera Kabushiki Kaisha. Power source switch for cameras. 4,504,133, Cl. 354-266.000.

Nakajima, Kouichi: *See*—
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Nakamori, Shigeru: *See*—
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Nakamura, Mitsuo: *See*—
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Nakamura, Tetsuya; Hobo, Nobuhito; Tsuzuki, Yoshihiko; Suzuki, Yutaka; Haseda, Satoshi; and Masuda, Akira, to Nippondenso Co., Ltd. Apparatus for controlling fuel injection timing. 4,503,830, Cl. 123-501.000.

Nakamura, Yoshimi: *See*—
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Nakanishi, Masahiro, to Kabushiki Kaisha Bandai. Releasable joint structure. 4,504,167, Cl. 403-325.000.

Nakanishi, Masayuki; Tsuruzoe, Hirohisa; Sato, Humiyuki; and Hashimoto, Tokuo, to Tokyo Shibaura Denki Kabushiki Kaisha. Cathode ray tube provided with a potted base. 4,504,763, Cl. 313-318.000.

Nakano, Katsuzi: *See*—
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Nakazawa, Kazuyoshi: *See*—
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Nakos, Steven T.: *See*—
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Namizaki, Hirofumi: *See*—
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Nar, Ramesh, to Carlingswitch, Inc. High inrush current circuit breaker. 4,504,807, Cl. 335-61.000.

Narisada, Masayuki; Onoue, Hiroshi; Ohtani, Mitsuaki; and Watanabe, Fumihiko, to Shionogi & Co., Ltd. Epimerization of malonic acid esters. 4,504,658, Cl. 544-90.000.

Narita, Ryuho: *See*—
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Narukawa, Hiroshi: *See*—
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Nasuta, Anthony T.; and Boenning, Robert A., to Westinghouse Electric Corp. Multi-channel test system using optical waveguide modulators. 4,504,921, Cl. 364-550.000.

Nate, Kazuo; Inoue, Takashi; and Yokono, Hitoshi, to Hitachi, Ltd. Positive type, radiation-sensitive organic polymer materials. 4,504,646, Cl. 528-16.000.

National Distillers and Chemical Corporation: *See*—
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National Research Development Corporation: *See*—
Elliott, Michael; Janes, Norman F.; and Khambay, Bhypinder P. S., 4,504,491, Cl. 514-521.000.

National Semiconductor Corporation: *See*—
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National Starch & Chem. Corp.: *See*—
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NCR Corporation: *See*—
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Nehmiz, Peter: *See*—
Bohlen, Harald; Engelke, Helmut; Greschner, Johann; and Nehmiz, Peter, 4,504,558, Cl. 430-30.000.

Neisen, Gerald F., to Brunswick Corporation. Fluid cooler for marine drives. 4,504,238, Cl. 440-89.000.

Nelligan, Jerome M.; and Heminover, Dale R., to Federal-Mogul Corporation. Microdrill package. 4,503,972, Cl. 206-379.000.

Nelsen, Richard C.; Wridt, Alfred A.; and Fuhreck, John E., to Snap-on Tools Corporation. Injector height measuring tool assembly. 4,503,619, Cl. 33-181.0AT.

Nelson, Richard V.; and Stephen, John F., to ICI Americas Inc. 2-Piperidones. 4,504,664, Cl. 546-243.000.

Nespurek, Stanislav: *See*—
Sorm, Miloslav; Langpaul, Josef; Ulbert, Karel; Kadlec, Karel; Skalicky, Stanislav; Brazdil, Miroslav; Nespurek, Stanislav; Kensa, Jaromir; Zvonicek, Miroslav; and Hrdina, Zdenek, 4,503,996, Cl. 222-321.000.

Netsu Kogyo Kabushiki Kaisha: *See*—
Sunakawa, Kiyoshi; and Maruyama, Shinichi, 4,504,220, Cl. 432-72.000.

Neubauer, Horst: *See*—
Timpl, Rupert; Brocks, Dietrich; Neubauer, Horst; and Strecker, Helmut, 4,504,587, Cl. 436-538.000.

Neuhauser, Gerhard: *See*—
Altenhofer, Herbert; Wintzheimer, Engelbert; and Neuhauser, Gerhard, 4,504,533, Cl. 428-70.000.

New England Deaconess Hospital: *See*—
Madras, Peter N., 4,503,568, Cl. 3-1.400.

Newall, Christopher E.: *See*—
O'Callaghan, Cynthia H.; Ayres, Barry E.; Livermore, David G. H.; Newall, Christopher E.; and Weir, Niall G., 4,504,477, Cl. 514-203.000.

Newell, Alton S.; Newell, Alton S., Jr.; Popovich, Paul D.; and Ewing, John R., to Newell Manufacturing Company. Hammer mill having capped disc rotor. 4,504,019, Cl. 241-73.000.

Newell, Alton S., Jr.: *See*—
Newell, Alton S.; Newell, Alton S., Jr.; Popovich, Paul D.; and Ewing, John R., 4,504,019, Cl. 241-73.000.

Newell Manufacturing Company: *See*—
Newell, Alton S.; Newell, Alton S., Jr.; Popovich, Paul D.; and Ewing, John R., 4,504,019, Cl. 241-73.000.

Newman, Melvin S.: *See*—
Krass, Dennis K.; Crano, John C.; and Newman, Melvin S., 4,504,671, Cl. 560-21.000.

Newman, Ray L.; and Hopkins, David H., to GTE Products Corporation. Heat recuperator with triple pass cross-flow ceramic core. 4,503,904, Cl. 165-76.000.

Newman, Ray L.; and Hopkins, David H., to GTE Products Corporation. Method of making ceramic core heat recuperator. 4,503,905, Cl. 165-76.000.

Newsam, Susan M., to Rolls-Royce Limited. Method of manufacturing a damped resonator acoustical panel. 4,504,346, Cl. 156-242.000.

Newton, Charles L.; and Stuber, Wayne G., to Air Products and Chemicals, Inc. Double mixed refrigerant liquefaction process for natural gas. 4,504,296, Cl. 62-31.000.

Ngan, King N.: *See*—
Nicol, Richard C.; Fenn, Brian A.; Clarke, Roger J.; and Ngan, King N., 4,504,860, Cl. 358-133.000.

NGK Spark Plug Co., Ltd.: *See*—
Sakai, Masao; Suzuki, Yasuhiko; and Sugimoto, Makoto, 4,504,411, Cl. 252-506.000.
Nguyen Chanh, Khe: *See*—
Takenouchi, Osamu; Nguyen Chanh, Khe; Kawara, Tatsuo; and Tanaka, Hisami, 4,504,560, Cl. 430-72.000.
Nicely, Garland L. Sponge-holding device. 4,503,579, Cl. 15-244.00A.
Nichias Corporation: *See*—
Hara, Sadao; Moritani, Hiroaki; Kaga, Hisashi; Minaki, Toshihiro; Shibata, Kenichi; Ogawa, Junichi; and Umino, Kaoru, 4,504,527, Cl. 427-318.000.
Nichols, Richard D. E., to Bianchi International. Swivel connected belt holster. 4,504,001, Cl. 224-198.000.
Nicholson, Myron D., to Union Carbide Corporation. Method for producing smoke colored and smoke flavored encased foodstuff. 4,504,501, Cl. 426-284.000.
Nicholson, Myron D., to Union Carbide Corporation. Method for preparing a tar-depleted liquid smoke composition. 4,504,507, Cl. 426-533.000.
Nicol, Richard C.; Fenn, Brian A.; Clarke, Roger J.; and Ngan, King N., to British Telecommunications. Method and process for transmitting an image. 4,504,860, Cl. 358-133.000.
Nicolin, Curt, to Handelsbolaget Eminent, Sven Hultman & Co. Clamping sleeve for tools or workpieces. 4,504,179, Cl. 409-234.000.
Nicolson, Margery, to Amgen. Hybridoma tumor cell lines and their monoclonal antibodies to human colony stimulating factor subclass number 1. 4,504,586, Cl. 436-518.000.
Nigam, Anil: *See*—
Toldi, George; Nigam, Anil; and Crain, Ronald A., 4,504,879, Cl. 360-105.000.
Nii, Riro; Toyoda, Nobuyuki; and Hojo, Akimichi, to Tokyo Shibaura Denki Kabushiki. Process for manufacturing a buried gate field effect transistor. 4,503,600, Cl. 29-571.000.
Niimura, Koichi: *See*—
Yoshikumi, Chikao; Fujii, Takayoshi; Saito, Kenichi; Fujii, Masahiko; and Niimura, Koichi, 4,504,487, Cl. 514-492.000.
Nilsson, Maths, to AB Ernol. Prefabricated shelf unit. 4,503,781, Cl. 108-64.000.
Ninomiya, Masakazu; Suzuki, Atsushi; and Kawashima, Yutaka, to Nippondenso Co., Ltd. Method and apparatus for controlling air-fuel ratio in an internal combustion engine. 4,503,824, Cl. 123-436.000.
Nippon Electric Co., Ltd.: *See*—
Sasaki, Yutaka, 4,504,798, Cl. 330-296.000.
Nippon Gakki Seizo Kabushiki Kaisha: *See*—
Akiyama, Junichiro; Tanaka, Mitsuhiro; and Moriuchi, Yoshihisa, 4,504,215, Cl. 431-168.000.
Yokoyama, Kenji, 4,504,793, Cl. 330-10.000.
Nippon Kogaku K.K.: *See*—
Toyoda, Kenji; Naito, Kaoru; and Yamamura, Norio, 4,504,837, Cl. 346-1.100.
Nippon Kokan Kabushiki Kaisha: *See*—
Miyashita, Tsuneo; Sakamoto, Noboru; and Fukuyo, Hiroshi, 4,504,306, Cl. 75-3.000.
Nippon Oil Co., Ltd.: *See*—
Tsunemi, Masaaki; and Sasaki, Umekichi, 4,504,403, Cl. 252-68.000.
Nippon Paint Co., Ltd.: *See*—
Furuno, Nobuo, 4,504,324, Cl. 148-6.15R.
Kuwajima, Teruaki; Miwa, Hiroshi; Kida, Katsuaki; and Ishikura, Shinichi, 4,504,609, Cl. 523-501.000.
Nippon Shokubai Kagaku Kogyo Co., Ltd.: *See*—
Ono, Tetsuji; Ichihara, Shoichi; Ohata, Tomohisa; and Terui, Sadao, 4,504,598, Cl. 502-303.000.
Nippon Soda Co., Ltd.: *See*—
Iwataki, Isao; Nakayama, Akira; Kaeriyama, Minoru; Ishikawa, Hisao; Hosaka, Hideo; and Kohara, Kenichi, 4,504,305, Cl. 71-98.000.
Nippon Soken, Inc.: *See*—
Obayashi, Hideki; Kohama, Tokio; Saito, Kimitaka; Kawai, Hisasi; and Ina, Toshikazu, 4,503,713, Cl. 73-862.340.
Nippon Steel Corporation: *See*—
Kishikawa, Kanichi; Nishino, Taneharu; and Nagasoe, Seiichi, 4,503,699, Cl. 72-222.000.
Kishikawa, Kanichi; and Nishino, Taneharu, 4,503,700, Cl. 72-225.000.
Tokunaga, Yoshikuni; and Yamada, Masato, 4,504,326, Cl. 148-12.00C.
Nippon Telegraph & Telephone Public Corporation: *See*—
Nakayama, Satoshi; Takeuchi, Hideaki; Murota, Junichi; Hurukado, Tatuhiko; Takeda, Shigeru; Suzuki, Masuo; Kurokawa, Harushige; and Ikeda, Humihide, 4,503,807, Cl. 118-719.000.
Nippon Thompson Co. Ltd.: *See*—
Mottate, Tatsuo, 4,504,097, Cl. 308-6.00C.
Nippondenso Co., Ltd.: *See*—
Miura, Kunio; Hasebe, Koshi; Ono, Takashi; Akutsu, Kazushi; Ohyama, Shinji; and Minami, Kazuaki, 4,504,913, Cl. 364-449.000.
Miyaki, Masahiko; Matsumura, Toshimi; Masuda, Akira; Sumitani, Sinya; Hasegawa, Takashi; and Hayakawa, Takahiro, 4,503,821, Cl. 123-357.000.
Nakamura, Tetsuya; Hobo, Nobuhito; Tsuzuki, Yoshihiko; Suzuki, Yutaka; Haseda, Satoshi; and Masuda, Akira, 4,503,830, Cl. 123-501.000.
Ninomiya, Masakazu; Suzuki, Atsushi; and Kawashima, Yutaka, 4,503,824, Cl. 123-436.000.
Sueishi, Motoharu; and Nakamura, Mitsuo, 4,503,827, Cl. 123-478.000.
Nishida, Toyomi; Suzuki, Takeshi; Hatamori, Takashi; and Terada, Sei, to Kawasaki Jukogyo Kabushiki Kaisha. Pulverizing mill apparatus. 4,504,020, Cl. 241-121.000.
Nishiga, Kazuya: *See*—
Kaneko, Akio; Kajiwara, Hitoshi; Haikawa, Yukihiko; and Nishiga, Kazuya, 4,504,968, Cl. 381-103.000.
Nishiguchi, Takashi; and Tamura, Shingo, to Hitachi, Ltd. Stylus for use with video disc and method of grinding such stylus. 4,504,940, Cl. 369-126.000.
Nishimoto, Shinichi: *See*—
Ota, Sadayasu; and Nishimoto, Shinichi, 4,503,853, Cl. 128-303.100.
Nishino, Taneharu: *See*—
Kishikawa, Kanichi; Nishino, Taneharu; and Nagasoe, Seiichi, 4,503,699, Cl. 72-222.000.
Kishikawa, Kanichi; and Nishino, Taneharu, 4,503,700, Cl. 72-225.000.
Nishio, Tadashi, to Starting Industry Company Limited; and Nissan Kogyo Co., Ltd. Control lever assembly for lawn mowers. 4,503,958, Cl. 192-12.00R.
Nishizaki, Genichi: *See*—
Honda, Yasuhiro; Ueno, Katumi; Nishizaki, Genichi; Kitahara, Harumi; and Kamioka, Hiroshi, 4,503,606, Cl. 29-701.000.
Nishizawa, Jun-ichi, to Zaidan Hojin Handotai Kenkyu Shinkokai. Static induction type semiconductor device. 4,504,847, Cl. 357-22.000.
Nishizawa, Jun-ichi; Ohmi, Tadahiro; Murakoshi, Makoto; and Shimanuki, Koji, to Semiconductor Research Foundation; and Fuji Photo Film Co., Ltd. Image signal readout methd for solid-state image sensor. 4,504,865, Cl. 358-213.000.
Nissan Chemical Industries Ltd.: *See*—
Ozawa, Kiyomi; Hatanaka, Masataka; Hirose, Masayoshi; and Kudo, Masaki, 4,504,483, Cl. 514-351.000.
Nissan Diesel Motor Company, Limited: *See*—
Fujihara, Hidefumi; Okazoe, Hiroshi; and Hashimoto, Yoichi, 4,503,814, Cl. 123-41.300.
Nissan Kogyo Co., Ltd.: *See*—
Nishio, Tadashi, 4,503,958, Cl. 192-12.00R.
Nissan Motor Company, Limited: *See*—
Adachi, Akira; Kubota, Takashi; Okada, Yukio; Miyazaki, Kenichi; and Hagiwara, Taro, 4,504,534, Cl. 428-71.000.
Hara, Seinosuke; and Miisho, Kazuyuki, 4,503,818, Cl. 123-90.160.
Honma, Masayuki, 4,504,252, Cl. 474-112.000.
Hosoya, Katsumi, 4,504,819, Cl. 340-60.000.
Nakagawa, Toyoaki, 4,503,820, Cl. 123-357.000.
Oaku, Takaaki; Maki, Yoshihiro; and Hokazono, Yasuzi, 4,504,312, Cl. 75-244.000.
Suzuki, Tadashi; Morimoto, Yoshiro; Hamada, Hideo; Suga, Masaaki; and Murasugi, Takashi, 4,503,956, Cl. 192-3.310.
Nitto Boseki Co., Ltd.: *See*—
Harada, Susumu; and Hasegawa, Sakuro, 4,504,640, Cl. 526-193.000.
Nitto Chemical Industry Co., Ltd.: *See*—
Sasaki, Yutaka; and Nakamura, Yoshimi, 4,504,599, Cl. 502-304.000.
Nitto Electric Industrial Co., Ltd.: *See*—
Yamamura, Yutaka; Kaneko, Tomomichi; and Hayashi, Shunichi, 4,504,571, Cl. 430-253.000.
Niwa, Koichi: *See*—
Kamehara, Nobuo; Kurihara, Kazuaki; and Niwa, Koichi, 4,504,339, Cl. 156-89.000.
Nixdorf Computer AG: *See*—
Volke, Hans-Werner; Hilkenmeier, Jurgen; Kohlhage, Hermann; and Tewes, Udo, 4,504,161, Cl. 400-605.000.
Nixdorff, Frank S.; and Dornbusch, Arthur H., to Anchor Hocking Corporation. Tamper-evident closure cap. 4,503,986, Cl. 215-252.000.
No-Muv Corporation, Inc.: *See*—
Mussallem, Charles S., Jr., 4,504,537, Cl. 428-167.000.
Mussallem, Charles S., Jr., 4,504,538, Cl. 428-167.000.
Nochumson, Samuel, to FMC Corporation. Polyacrylamide cross-linked with a polysaccharide resin as electrophoretic gel medium. 4,504,641, Cl. 526-238.200.
Noji, Takashi; Obata, Yoshiharu; and Higashi, Takayoshi, to Tokyo Shibaura Denki Kabushiki Kaisha. Input screen for an image intensifier tube and a method of making the same. 4,504,738, Cl. 250-483.100.
Noma, Koichi: *See*—
Mihara, Toshihiro; Kusuda, Takao; Noma, Koichi; and Taki, Hiromitsu, 4,504,218, Cl. 431-326.000.
Nomura, Masami, to Mitsubishi Denki Kabushiki Kaisha. AC elevator control system. 4,503,938, Cl. 187-29.00R.
Nomura, Noboru: *See*—
Kaminaka, Nobuyuki; Kanai, Kenji; Nomura, Noboru; and Omata, Yuji, 4,504,540, Cl. 428-195.000.
Nooijen, Godefridus A. H.: *See*—
van de Leemput, Lambertus J. M. A.; Nooijen, Godefridus A. H.; and van der Loo, Hendrikus W., 4,504,592, Cl. 502-104.000.
Noranda Inc.: *See*—
Mackey, Phillip J.; and Bailey, J. Barry W., 4,504,309, Cl. 75-72.000.
Norandy, Incorporated: *See*—
Andrews, Norwood H., 4,504,017, Cl. 241-40.000.
Nordquist, Dennis D.; and Vandewege, Derron G., to Idea Development Engineers of Arizona, Inc. Louver system. 4,503,755, Cl. 98-110.000.
Norin, Mats; and Persson, Lars-Olov, to Pressmaster Tool AB. Combination wire stripping and cutting tool. 4,503,574, Cl. 7-107.000.

Norman Wade Company Limited: *See*—
Morand, Joseph E. D. M., 4,503,979, Cl. 211-45.000.
Northland Aluminum Products, Inc.: *See*—
Jorgensen, Jorgen A.; and Nygren, Donald W., 4,504,715, Cl. 219-10.55F.
Norton, Charles J., to Marathon Oil Company. Process for conformance control using a polymer flocculate. 4,503,912, Cl. 166-295.000.
Norton, Gerald W., to Speedgrip Chuck, Inc. Anti-centrifugal chuck. 4,504,070, Cl. 279-1.00C.
Norton, Rickie E. Floating head apparatus for swimming pool cleaning system. 4,503,874, Cl. 134-167.00R.
Norton, Robert O.: *See*—
DiCarlo, Leonard J.; Ares, Roland A.; and Norton, Robert O., 4,503,685, Cl. 62-193.000.
Novak, Jiri; Pigrt, Jan; Bezdicek, Jan; Fenik, Milan; Kuda, Vladimir; and Vasicek, Vladimir, to ZVS Vyzkumnevyvojovy ustav koncernova ucelova organizace. Loom. 4,503,891, Cl. 139-116.000.
Novotny, Bernd: *See*—
Elmis, Herbert; and Novotny, Bernd, 4,504,799, Cl. 331-1.00A.
Nozaki, Hiromi; and Yoshida, Eiichi, to Konishiroku Photo Industry Co., Ltd. Copying apparatus. 4,504,139, Cl. 355-14.00R.
NTN Toyo Bearing Company, Limited: *See*—
Miki, Yutaka; Kuroda, Masayuki; and Omori, Tetsumi, 4,504,099, Cl. 384-543.000.
Nuckols, Marshall L.: *See*—
Lippitt, Maxwell W., Jr.; and Nuckols, Marshall L., 4,503,565, Cl. 2-2.10R.
Nudd, Conrad T.; and Nudd, Frederick A., Jr. Tower base assembly. 4,503,645, Cl. 52-40.000.
Nudd, Frederick A., Jr.: *See*—
Nudd, Conrad T.; and Nudd, Frederick A., Jr., 4,503,645, Cl. 52-40.000.
Nussbaum, Helmut; and Weber, Adolf, to Diehl GmbH & Co. Fragmentation body for fragmentation projectiles and warheads. 4,503,776, Cl. 102-496.000.
Nygren, Donald W.: *See*—
Jorgensen, Jorgen A.; and Nygren, Donald W., 4,504,715, Cl. 219-10.55F.
Oaku, Takaaki; Maki, Yoshihiro; and Hokazono, Yasuzi, to Nissan Motor Company, Limited. Wear-resistant sintered ferrous alloy and method of producing same. 4,504,312, Cl. 75-244.000.
Obata, Yoshiharu: *See*—
Noji, Takashi; Obata, Yoshiharu; and Higashi, Takayoshi, 4,504,738, Cl. 250-483.100.
Obayashi, Hideki; Kohama, Tokio; Saito, Kimitaka; Kawai, Hisasi; and Ina, Toshikazu, to Nippon Soken, Inc. Dual sensitivity torque detector. 4,503,713, Cl. 73-862.340.
O'Blasny, Richard H., to Delta Central Refining, Inc. Rerefining used oil with borohydride reducing agents. 4,504,383, Cl. 208-179.000.
O'Callaghan, Cynthia H.; Ayres, Barry E.; Livermore, David G. H.; Newall, Christopher E.; and Weir, Niall G., to Glaxo Group Limited. Cephalosporin antibiotics. 4,504,477, Cl. 514-203.000.
Occidental Chemical Corporation: *See*—
Ilardo, Charles S.; and Duffy, James J., 4,504,611, Cl. 524-101.000.
Oce-Nederland B.V.: *See*—
Koeleman, Gerardus A. J.; and van de Laarschot, Franciscus A. A. E., 4,503,960, Cl. 192-127.000.
Ochiai, Masahiko, to Kyushu Hitachi Maxell, Ltd. Push-button switch locking device for use in electric appliance. 4,504,707, Cl. 200-42.00R.
O'Connell, Daniel D.; and Broz, Thomas A., to United States Gypsum Company. Sprayable acoustical composition. 4,504,602, Cl. 521-78.000.
O'Connor, Paul B.: *See*—
Kosinski, Sandra G.; Lemaire, Paul J.; and O'Connor, Paul B., 4,504,297, Cl. 65-3.110.
MacChesney, John B.; and O'Connor, Paul B., 4,504,299, Cl. 65-3.120.
Oda, Yoshio: *See*—
Matsuo, Masashi; Itoh, Katsuji; Hayashi, Takao; and Oda, Yoshio, 4,504,401, Cl. 252-8.750.
Odawara, Kazuharu, to Tokyo Shibaura Denki Kabushiki Kaisha. Radiation-sensitive record disc. 4,504,842, Cl. 346-137.000.
Odebrecht, Wolfgang: *See*—
Andres, Rudolf; Grantz, Helmut; Munzel, Wolf-Dietrich; and Odebrecht, Wolfgang, 4,503,906, Cl. 165-104.210.
Odermann, Charles R., to Singer Company, The. Bobbin winding actuation by buttonhole selection. 4,503,793, Cl. 112-262.100.
Odetics, Inc.: *See*—
Bartholet, Stephen J.; and Sivaslian, Armen H., 4,503,924, Cl. 180-8.600.
Oe, Kunio: *See*—
Asai, Koichi; Oe, Kunio; and Tuda, Mamoru, 4,503,607, Cl. 29-832.000.
Oertle, Donald H.; and Ivie, Randall G., to Conoco Inc. Crack detection by electrical resistance. 4,503,710, Cl. 73-763.000.
Oexler, Rudolf, to Schubert & Salzer. Open-end spinning rotor. 4,503,663, Cl. 57-404.000.
Ogata, Yasuzi: *See*—
Imai, Toshihiro; and Ogata, Yasuzi, 4,504,124, Cl. 350-427.000.
Ogawa, Junichi: *See*—
Hara, Sadao; Moritani, Hiroaki; Kaga, Hisashi; Minaki, Toshihiro; Shibata, Kenichi; Ogawa, Junichi; and Umino, Kaoru, 4,504,527, Cl. 427-318.000.
Ogawa, Mutsuo; and Murayama, Noboru, to Ricoh Company, Ltd. Digital facsimile communication system capable of representing tone differences. 4,504,115, Cl. 358-260.000.
Ohata, Tomohisa: *See*—
Ono, Tetsuji; Ichihara, Shoichi; Ohata, Tomohisa; and Terui, Sadao, 4,504,598, Cl. 502-303.000.
Ohgami, Masaaki; and Matsui, Fujio, to Fuji Jukogyo Kabushiki Kaisha. Control system. 4,503,828, Cl. 123-489.000.
Ohira, Tsuyoshi: *See*—
Takemae, Yoshihiro; Ohira, Tsuyoshi; and Enomoto, Seiji, 4,504,929, Cl. 365-210.000.
Ohmi, Tadahiro: *See*—
Nishizawa, Jun-ichi; Ohmi, Tadahiro; Murakoshi, Makoto; and Shimanuki, Koji, 4,504,865, Cl. 358-213.000.
Ohmori, Akira; and Tomihashi, Nobuyuki, to Daikin Kogyo Co., Ltd. Acrylic type self-adhesive. 4,504,642, Cl. 526-246.000.
Ohno, John M., to General Electric Company. Indexable composite cutting insert having corner cutting edges. 4,504,284, Cl. 51-309.000.
Ohshima, Takeshi: *See*—
Haga, Takahiro; Koyanagi, Tohru; Nakajima, Toshio; and Ohshima, Takeshi, 4,504,665, Cl. 546-318.000.
Ohshiro, Hideyuki, to Shiroki Kinzoku Kogyo Kabushiki Kaisha. Reclining angle adjustment device. 4,504,091, Cl. 297-362.000.
Ohtani, Mitsuaki: *See*—
Narisada, Masayuki; Onoue, Hiroshi; Ohtani, Mitsuaki; and Watanabe, Fumihiko, 4,504,658, Cl. 544-90.000.
Ohyaba, Takashi; Kamishima, Minoru; Kinoshita, Shozo; Kawamura, Tetsuo; and Matsuhisa, Hiroaki, to Pioneer Electronic Corporation. Loudspeaker system. 4,504,704, Cl. 179-115.5DV.
Ohyama, Shinji: *See*—
Miura, Kunio; Hasebe, Koshi; Ono, Takashi; Akutsu, Kazushi; Ohyama, Shinji; and Minami, Kazuaki, 4,504,913, Cl. 364-449.000.
Oka, Yoshinobu, to Laurel Bank Machine Co., Ltd. Abnormal flow detecting circuit in paper sheet counting machine. 4,504,916, Cl. 364-471.000.
Okada, Satoshi: *See*—
Kitaura, Yoshihiko; Nakaguchi, Osamu; Hemmi, Keiji; Aratani, Matsuhiko; Takeno, Hidekazu; Okada, Satoshi; Tanaka, Hirokazu; Hashimoto, Masashi; Kuroda, Yoshio; Iguchi, Eiko; Kohsaka, Masanobu; Aoki, Hatsuo; and Imanaka, Hiroshi, 4,504,584, Cl. 435-253.000.
Okada, Yukio: *See*—
Adachi, Akira; Kubota, Takashi; Okada, Yukio; Miyazaki, Kenichi; and Hagiwara, Taro, 4,504,534, Cl. 428-71.000.
Okamoto, Akito: *See*—
Fujii, Hiroshi; Okamoto, Akito; and Watanabe, Tuyoshi, 4,504,919, Cl. 364-478.000.
Okamura, Masatoshi; and Shiba, Haruo, to TDK Corporation. Magnetic tape clamping device. 4,504,027, Cl. 242-74.100.
Okamura, Michiya: *See*—
Yui, Hiroshi; Sobajima, Yoshihiro; Higashide, Osamu; Imamura, Tsuyoshi; Okamura, Michiya; and Hattori, Satoru, 4,504,617, Cl. 524-426.000.
Okatsuka, Hisashi; Taniguchi, Koichi; Konno, Mitsuo; and Narita, Ryuho, to Tokyo Shibaura Denki Kabushiki Kaisha. Microwave heating apparatus with solid state microwave oscillating device. 4,504,718, Cl. 219-10.55B.
Okazoe, Hiroshi: *See*—
Fujihara, Hidefumi; Okazoe, Hiroshi; and Hashimoto, Yoichi, 4,503,814, Cl. 123-41.300.
Oki, Koji: *See*—
Yamaoka, Hideyuki; Hatano, Michiharu; Miyazaki, Tomio; Shimoda, Teruhisa; and Oki, Koji, 4,504,043, Cl. 266-160.000.
Okumura, Hiroyuki: *See*—
Otani, Kozo; Yamada, Yoshio; and Okumura, Hiroyuki, 4,504,648, Cl. 528-76.000.
Okumura, Takeshi; Nakanishi, Kiyoshi; Kanda, Mutsumi; Kotani, Takeshi; and Inoue, Tokuta, to Toyota Jidosha Kabushiki Kaisha. Helically-shaped intake port of an internal-combustion engine. 4,503,819, Cl. 123-188.00M.
Okura Kogyo Kabushiki Kaisha: *See*—
Matsuda, Hideaki; and Saheki, Takasi, 4,504,318, Cl. 106-90.000.
Okutu, Toshimitu: *See*—
Miyoshi, Takahito; Okutu, Toshimitu; and Fujiyama, Masaaki, 4,504,542, Cl. 428-336.000.
Okuya, Tsutae; and Ito, Yoshiyuki, to Alps Electric Co., Ltd. Slide rheostat. 4,504,818, Cl. 338-119.000.
Olesin, Andrew S.: *See*—
Smith, Michael D.; Olesin, Andrew S.; and Whatley, Roger A., 4,504,747, Cl. 307-475.000.
Olin Corporation: *See*—
Katz, Lawrence E.; and Dumas, Richard H., 4,504,667, Cl. 546-345.000.
Saeman, Walter C., 4,504,457, Cl. 423-474.000.
Olivera, Raul: *See*—
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Olson, Samson A.; and Williams, George C., to Hypex, Incorporated. Hydraulic pumping unit. 4,503,752, Cl. 91-48.000.
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Sampson, Stephen A.; and Olson, Thor F., 4,503,611, Cl. 29-845.000.

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Fujii, Tooru, 4,504,125, Cl. 350-427.000.
Imai, Toshihiro; and Ogata, Yasuzi, 4,504,124, Cl. 350-427.000.
Imai, Yugo, 4,504,874, Cl. 360-66.000.
Shishido, Yoshio, 4,503,865, Cl. 128-774.000.
Takayama, Syuichi, 4,503,842, Cl. 128-4.000.
Tsukaya, Takashi; and Takamatsu, Takeshi, deceased, 4,503,841, Cl. 128-4.000.

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Omega Air Flow-21, Ltd.: *See*—
Pryputsch, Gunter G.; Leila, Lennox M.; Parkinson, Gerald E.; and Arneson, Leonard A., 4,503,760, Cl. 99-447.000.

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Higaki, Yoshikazu; and Omori, Hiroyuki, 4,504,423, Cl. 260-465.700.

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Miki, Yutaka; Kuroda, Masayuki; and Omori, Tetsumi, 4,504,099, Cl. 384-543.000.

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Sukimoto, Yasuyuki; and Nagao, Toshiaki, 4,504,010, Cl. 236-46.00F.

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Rosa, Eugene J.; and Jerde, James B., 4,503,707, Cl. 73-336.500.

O'Neil, Michael J. Building evacuation device. 4,503,933, Cl. 182-231.000.

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Ono, Takashi: *See*—
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Ono, Tetsuji; Ichihara, Shoichi; Ohata, Tomohisa; and Terui, Sadao, to Nippon Shokubai Kagaku Kogyo Co., Ltd. Process for producing honeycomb catalyst for exhaust gas conversion. 4,504,598, Cl. 502-303.000.

Onodera, Hiromi; Wakabayashi, Noriaki; Yamada, Kiichiro; and Sugizaki, Yasushi, to Matsushita Electric Industrial Co., Ltd. Linear motor. 4,504,750, Cl. 310-12.000.

Onoue, Hiroshi: *See*—
Narisada, Masayuki; Onoue, Hiroshi; Ohtani, Mitsuaki; and Watanabe, Fumihiko, 4,504,658, Cl. 544-90.000.

OPT Systems: *See*—
Kunicki, Wojciech; and Jackson, Gilbert S., 4,504,446, Cl. 422-186.190.

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Stahl, Bernhard; and Bohm, Horst, 4,503,725, Cl. 74-424.80B.

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Orain, Michel A., to Glaenzer Spicer. Telescopic coupling employing rollers and applications thereof. 4,504,245, Cl. 464-167.000.

Orcutt, John W., to Texas Instruments Incorporated. Method for semiconductor device packaging. 4,504,435, Cl. 264-272.170.

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Zingrini, Carlo; and Oreglio, Maurizio, 4,504,107, Cl. 339-125.00R.

Oritani, Atsushi, to Fujitsu Limited. Sense amplifier circuit. 4,504,748, Cl. 307-530.000.

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Gaster, Laramie M.; and Orlek, Barry S., 4,504,480, Cl. 514-214.000.

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Herzel, Joachim; Simeth, Claus; Mitze, Rudolf; and Ortner, Robert, 4,503,771, Cl. 101-247.000.

Osaka, Susumu; and Sagawa, Midori, to RCA Corporation. Venetian blind construction. 4,503,900, Cl. 160-172.000.

Osborne, Dennis R. S., to Duke University. Head support. 4,504,050, Cl. 269-328.000.

Osteen, John F., to Dacam Corporation. Carrier applicator. 4,503,657, Cl. 53-48.000.

Ostertag, Edward L.: *See*—
Ekelman, Ernest P., Jr.; and Ostertag, Edward L., 4,504,805, Cl. 333-126.000.

Ota, Sadayasu; and Nishimoto, Shinichi, to Kabushiki Kaisha Morita Seisakusho. Contra angle handpiece for dental treatment by laser beams. 4,503,853, Cl. 128-303.100.

Otani, Kozo; Yamada, Yoshio; and Okumura, Hiroyuki, to Toyo Tire & Rubber Company, Limited. Polyurethaneurea and process for preparing the same. 4,504,648, Cl. 528-76.000.

Otani, Sugio; Gomi, Shimpei; and Mogi, Fumio, to Fuji Standard Research Inc. Carbonaceous pitch, process for the preparation thereof and use thereof to make carbon fibers. 4,504,455, Cl. 423-447.600.

Otobe, Yutaka: *See*—
Hasegawa, Shumpei; and Otobe, Yutaka, 4,503,829, Cl. 123-492.000.

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Kitamura, Masatsugu; Inami, Mamoru; Tanaka, Yoshiaki; and Otsuki, Zenju, 4,504,870, Cl. 360-25.000.

OTV (Omnium de Traitement et de Valorisation): *See*—
Desbos, Gilbert; and Faivre, Michel, 4,504,388, Cl. 210-150.000.

Outboard Marine Corporation: *See*—
Blanchard, Clarence E., 4,504,237, Cl. 440-61.000.

Ovshinsky, Stanford R.; Allred, David D.; Walter, Lee; and Hudgens, Stephen J., to Energy Conversion Devices, Inc. Method of making amorphous semiconductor alloys and devices using microwave energy. 4,504,518, Cl. 427-38.000.

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Tabak, Samuel A.; Wright, Bernard S.; and Owen, Hartley, 4,504,693, Cl. 585-520.000.

Owens-Corning Fiberglas Corporation: *See*—
Chang, Robert C.; and McCoy, Dale E., 4,504,619, Cl. 524-524.000.
Yeager, Raymond W.; and Marzocchi, Alfred, 4,503,655, Cl. 52-747.000.
Zion, Earl M., 4,504,175, Cl. 405-260.000.

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Swartzbaugh, Peter T.; and Hehl, Edward M., 4,503,985, Cl. 215-252.000.

Oy W. Rosenlew AB: *See*—
Hietanen, Esko; and Airaksinen, Pentti, 4,503,721, Cl. 74-44.000.

Ozawa, Kiyomi; Hatanaka, Masataka; Hirose, Masayoshi; and Kudo, Masaki, to Nissan Chemical Industries Ltd. Fluorine substituted pyridine methyl esters and insecticidal and acaricidal compositions thereof. 4,504,483, Cl. 514-351.000.

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Yamaguchi, Toyohiko; Kashima, Koichi; Ozutsumi, Minoru; and Morinaga, Masaru, 4,504,651, Cl. 528-360.000.

Paccar Inc.: *See*—
Strong, John R., 4,504,079, Cl. 280-683.000.

Padget, John C., to Imperial Chemical Industries PLC. Method of thickening aqueous latex compositions. 4,504,614, Cl. 524-284.000.

Pagel, Hayes L. Molecular gas detector and analyzer. 4,503,703, Cl. 73-23.000.

Pai, Damodar M.; Pochan, Darlyn F.; and Pochan, John M., to Xerox Corporation. Method for the preparation of photoconductive compositions. 4,504,564, Cl. 430-132.000.

Palmason, Jon A., to Kvikk s.f. Apparatus for cutting fish heads. 4,503,588, Cl. 17-61.000.

Palmer, James A.; and Gromak, Stephen C., to Amigo Sales, Inc. Detachable steerable power unit for occupant-propelled wheelchairs. 4,503,925, Cl. 180-13.000.

Palosi, Eva: *See*—
Toth, Edit; Torley, Jozsef; Palosi, Eva; Szeberenyi, Szabolcs; Szporny, Laszlo; Gorog, Sandor; and Hajdu, Istvan, 4,504,481, Cl. 514-255.000.

Papalexis, Gregory C.; and Elliott, Richard I. Hotdog roll aligner. 4,503,966, Cl. 198-382.000.

Parente, Jerry. Sliding door system. 4,503,637, Cl. 49-141.000.

Park, David B.: *See*—
Khoylian, Rouzas R.; Cowdery, James R.; and Park, David B., 4,503,968, Cl. 198-472.000.

Parker-Hannifin Corporation: *See*—
Horl, Ernst, 4,504,066, Cl. 277-84.000.
Sharp, Bernard C., 4,503,580, Cl. 15-250.320.
Sharp, Bernard C., 4,504,116, Cl. 350-637.000.
Viola, Frank J.; Schaub, Erwin L.; and Burke, Lawrence H., 4,504,816, Cl. 337-255.000.

Parkinson, Gerald E.: *See*—
Pryputsch, Gunter G.; Leila, Lennox M.; Parkinson, Gerald E.; and Arneson, Leonard A., 4,503,760, Cl. 99-447.000.

Parlman, Robert M.; and Kimble, James B., to Phillips Petroleum Company. Trithiocarbonates as ore flotation agents. 4,504,384, Cl. 209-166.000.

Parmelee, William H.; and Sutton, Roger D. Apparatus for intravenous injection of liquids. 4,504,267, Cl. 604-134.000.

Passarell, Wayne H.; and Ziegler, Jeffry A., to Ford Motor Company. Engine mount preloaded in shear. 4,504,036, Cl. 248-632.000.

Pasternak, Adalbert, to Dragerwerk Aktiengesellschaft. Cold protection suit having a protective breathing device. 4,503,850, Cl. 128-201.250.

Patch, Stanley J., to United States of America, Navy. Prefabricated dental onlays and method therefor. 4,504,230, Cl. 433-219.000.

Patel, Arvind M., to International Business Machines Corporation. Syndrome processing unit for multibyte error correcting systems. 4,504,948, Cl. 371-38.000.

Patel, Sharadchandra D.: *See*—
Conn, James K.; and Patel, Sharadchandra D., 4,504,806, Cl. 333-241.000.

Patel, Vikram M.: *See*—
Vora, Madhukar B.; and Patel, Vikram M., 4,503,598, Cl. 29-571.000.

Pattern Processing Technologies, Inc.: *See*—
Werth, Larry J.; and Paulson, Larry G., 4,504,970, Cl. 382-14.000.

Paulson, Larry G.: *See*—
Werth, Larry J.; and Paulson, Larry G., 4,504,970, Cl. 382-14.000.

Payne, Charles H.: *See*—
Kent, William C.; and Payne, Charles H., 4,504,008, Cl. 228-180.200.

Payne, Errol G.; McGregor, Charles D.; and Uyeda, Tim M., to Ramtek Corporation. Color printer and multi-ribbon cartridge therefor. 4,504,160, Cl. 400-196.100.

Payne, George B.: *See*—
Estreicher, Herbert; and Payne, George B., 4,504,304, Cl. 71-88.000.

Pearson, Ernest J., to Chloride Group Public Limited Company. Multicell electric storage batteries. 4,504,556, Cl. 429-136.000.

Pefley, Richard K.; and Pullman, James B., to Prodatek Corporation. Liquid fuel system method and apparatus. 4,503,832, Cl. 123-527.000.

Pelc, Norbert J.: *See*—
Riederer, Stephen J.; and Pelc, Norbert J., 4,504,908, Cl. 364-414.000.

Pelgrom, Marcellinus J. M.: *See*—
Harwig, Hendrik A.; Slotboom, Jan W.; and Pelgrom, Marcellinus J. M., 4,504,930, Cl. 365-238.000.

Pennebaker, William B.: *See*—
Anastassiou, Dimitris; and Pennebaker, William B., 4,504,864, Cl. 358-167.000.

Penner, David A.: *See*—
Petty, Dale H.; Penner, David A.; and Van Den Berghe, James A., 4,503,859, Cl. 128-635.000.

Pennington, Alfred C. Lever attachment for a rotary door knob. 4,504,087, Cl. 292-347.000.

Pennwalt Corporation: *See*—
Chen, Johnson C. H.; and Eichelberger, John L., 4,504,402, Cl. 252-70.000.

Pennywise Enterprises, Inc.: *See*—
Rosenthal, Philip R., 4,504,888, Cl. 362-18.000.

Pentel Kabushiki Kaisha: *See*—
Hashimoto, Junichi; and Sekiguchi, Tomozo, 4,504,163, Cl. 401-53.000.

Pepera, Marc A.: *See*—
Desmond, Michael J.; and Pepera, Marc A., 4,504,590, Cl. 502-73.000.

Perkin-Elmer Corporation, The: *See*—
Trost, David, 4,504,144, Cl. 356-150.000.

Perry, Thomas J., to GTE Automatic Electric Incorporated. PCM Supervision data reformatting circuit. 4,504,947, Cl. 370-99.000.

Persson, Lars-Olov: *See*—
Norin, Mats; and Persson, Lars-Olov, 4,503,574, Cl. 7-107.000.

Pervier, James W.: *See*—
Davis, Ruth A.; Herron, Donn M.; Pervier, James W.; and Vines, Harvey L., 4,504,295, Cl. 62-30.000.

Pesa, Frederick A.: *See*—
Fox, Joseph R.; and Pesa, Frederick A., 4,504,684, Cl. 568-454.000.

Pesenacker, Manfred: *See*—
Hunger, Klaus; and Pesenacker, Manfred, 4,504,416, Cl. 534-742.000.

Peters, Don B.: *See*—
Brown, Omar L.; Peters, Don B.; and Schubert, James R., 4,503,989, Cl. 220-269.000.

Petersen, David A., to Ampex Corporation. Digital maximum likelihood detector for class IV partial response. 4,504,872, Cl. 360-40.000.

Peterson, Luetta M. Coiffure styling prop. 4,503,870, Cl. 132-9.000.

Petracek, Vaclav; and Wang, Kenneth Y., to Burlington Industries, Inc. Warp yarn reinforced ultrasonic web bonding. 4,504,539, Cl. 428-195.000.

Petty, Dale H.; Penner, David A.; and Van Den Berghe, James A., to William Beaumont Hospital. Esophageal function and EKG monitor. 4,503,859, Cl. 128-635.000.

Pfahler, Gerhard: *See*—
Wiezer, Hartmut; and Pfahler, Gerhard, 4,504,661, Cl. 544-198.000.

Phillips, Kevin J.; and Tracy, Terry G., to RCA Corporation. Control of nutation in a spacecraft. 4,504,032, Cl. 244-170.000.

Phillips Petroleum Company: *See*—
Beardmore, David H., 4,504,211, Cl. 431-3.000.
Carlisle, Thomas A.; Smith, Phillip R.; and Thorn, Frank H., deceased, 4,504,286, Cl. 55-20.000.
Carrow, Guy E., 4,504,086, Cl. 285-156.000.
Efner, Howard F.; and Schiff, Sidney, 4,504,280, Cl. 44-63.000.
Kukes, Simon G.; and Banks, Robert L., 4,504,694, Cl. 585-643.000.
Leland, John E., 4,504,551, Cl. 428-419.000.
Matthews, William E., 4,504,397, Cl. 210-804.000.
McDaniel, Max P.; and Johnson, Marvin M., 4,504,638, Cl. 526-134.000.
Mills, Kenneth R., 4,504,615, Cl. 524-291.000.
Parlman, Robert M.; and Kimble, James B., 4,504,384, Cl. 209-166.000.
Stapp, Paul R., 4,504,399, Cl. 252-8.55D.

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Logie, Frank M.; and Phillips, Ronald, 4,504,810, Cl. 335-261.000.

Piazzola, Gaetano. Electric resistance heating assembly for plastics material extruders. 4,504,734, Cl. 219-550.000.

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Schippers, Heinz; Lenk, Erich; Martens, Gerhard; Mayer, Manfred; Pieper, Werner; and Putsch, Siegfried, 4,504,021, Cl. 242-18.100.

Pilie' , Walter E.: *See*—
Murphy, Gerald J.; Pilie' , Walter E.; and Garaudy, Glenn, 4,503,875, Cl. 137-83.000.

Pilkington, Mervin V.; Creasey, Jack R.; and Becken, Richard H., to Goodyear Tire & Rubber Company, The. Energy absorbing rubber composition. 4,504,604, Cl. 523-167.000.

Pilloud, Bernard, to LGZ Landis & Gyr Zug AG. Receiving arrangements for audio frequency signals. 4,504,705, Cl. 179-2.510.

Pilny, Richard J.: *See*—
Harpel, William L.; and Pilny, Richard J., 4,504,395, Cl. 210-712.000.

Pilukaitis, Raymond W.; and Wilson, Thomas G., Jr., to AT&T Bell Laboratories. Start-up transient control for a DC-to-DC converter powered by a current-limited source. 4,504,898, Cl. 363-49.000.

Pinckard, R. Neal: *See*—
Hanahan, Donald J.; and Pinckard, R. Neal, 4,504,474, Cl. 514-78.000.

Pine, Lloyd A., to Exxon Research and Engineering Co. Phosphorus-containing catalyst and catalytic cracking process utilizing the same. 4,504,382, Cl. 208-114.000.

Pines, Arthur N.; and Sabia, Angelo J., to Union Carbide Corporation. Elastomeric silicone finishes applied to substrates and method of preparing same. 4,504,549, Cl. 428-447.000.

Pinson, George T., to Boeing Company, The. Digital fluid stepping motor. 4,503,751, Cl. 91-36.000.

Pioneer Electronic Corporation: *See*—
Ohyaba, Takashi; Kamishima, Minoru; Kinoshita, Shozo; Kawamura, Tetsuo; and Matsuhisa, Hiroaki, 4,504,704, Cl. 179-115.5DV.

Piper, Douglas E., to Woven Electronics Corporation. Tubular woven controlled impedance cable. 4,504,696, Cl. 174-32.000.

Pirkle, James C.: *See*—
Wright, Franklin J.; Richard, Michael A.; and Pirkle, James C., 4,504,600, Cl. 518-717.000.

Pitney Bowes Inc.: *See*—
Couper, Robert A.; Lillie, Terrance L.; and Sera, Kiyoshi, 4,504,828, Cl. 340-735.000.
Daniels, Edward P.; and Dlugos, Daniel F., 4,504,915, Cl. 364-466.000.

Pittenger, Robert L., to Rockwell International Corporation. Converging beam linear optical scanner. 4,504,110, Cl. 350-6.300.

Pittet, Alan O.; Courtney, Thomas F., Jr.; and Muralidhara, Ranya, to International Flavors & Fragrances Inc. Flavoring with phenylalkyl mercaptals. 4,504,508, Cl. 426-535.000.

Pittwood, Donald G.: *See*—
Gobran, Frederick S.; Grospin, Fred E.; Pittwood, Donald G.; and Shlatz, Myron F., 4,504,723, Cl. 219-85.00F.

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Novak, Jiri; Pjgrt, Jan; Bezdicek, Jan; Fenik, Milan; Kuda, Vladimir; and Vasicek, Vladimir, 4,503,891, Cl. 139-116.000.

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Krause, Erich, 4,504,720, Cl. 219-10.770.

Planer, Norman G., to Honeywell Inc. Electronic watthour meter. 4,504,787, Cl. 324-142.000.

Planet Products Corporation: *See*—
Griesdorn, Carl P., 4,504,004, Cl. 226-150.000.

Pletsch, Hubert: *See*—
Wolf, Franz-Josef; Pletsch, Hubert; and Benneyan, Gregoire, 4,504,244, Cl. 464-83.000.

Plouviez, Eric, to Thomson-CSF. Wide band frequency phase locked loop frequency synthesizer. 4,504,800, Cl. 331-1.00A.

Plummer, Mark A., to Marathon Oil Company. Sodium tetrachloroaluminate catalyzed process for the molccular weight reduction of liquid hydrocarbons. 4,504,378, Cl. 208-108.000.

Pochan, Darlyn F.: *See*—
Pai, Damodar M.; Pochan, Darlyn F.; and Pochan, John M., 4,504,564, Cl. 430-132.000.

Pochan, John M.: *See*—
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Pola Chemical Industries, Inc.: *See*—
Inui, Emiko; Iwano, Takao; Hara, Seishi; Mikami, Yukio; Kurita, Hideo; and Aoki, Yoshiaki, 4,504,433, Cl. 264-232.000.

Polchaninoff, Michael, to Langer Biomechanics Group, Inc., The. Flexible force sensor. 4,503,705, Cl. 73-172.000.

Polen, Karl L.; and Scott, Edward S., to Alliance Machine Company, The. Weighing system. 4,503,921, Cl. 177-147.000.

Pollard, David D.; and Ho, Ting-Long, to Westinghouse Electric Corp. Disc-type semiconductor mounting arrangement with force distribution spacer. 4,504,850, Cl. 357-79.000.

Polysar Limited: *See*—
Duffy, John P., 4,504,654, Cl. 528-499.000.

Pontius, Harold T., to Columbus Industries, Inc. Odor filter media. 4,504,290, Cl. 55-316.000.

Pook, Harold W. M., to Johnson, James Frederick John. Releasably mutually-adherent materials. 4,504,550, Cl. 428-461.000.

Poponiak, Michael R.: *See*—
Gaind, Arun K.; Kulkarni, Subhash B.; and Poponiak, Michael R., 4,504,330, Cl. 148-175.000.

Popovich, Paul D.: *See*—
Newell, Alton S.; Newell, Alton S., Jr.; Popovich, Paul D.; and Ewing, John R., 4,504,019, Cl. 241-73.000.

Popyach, Stephen A.: *See*—
Evans, Julie F.; Findlay, Hugh T.; Popyach, Stephen A.; and Tao, Deh C., 4,504,840, Cl. 346-76.0PH.

Post, Gerhard. Structural building elements for construction of simulated log houses. 4,503,647, Cl. 52-233.000.

Potoff, Rubin. Screw cap construction. 4,503,987, Cl. 215-329.000.

Potter, Patrick L. Leaf and lawn debris lift and bagger. 4,503,661, Cl. 56-16.600.

Pottle, John F.: *See*—
Cygan, Lawrence F.; Olivera, Raul; and Pottle, John F., 4,504,886, Cl. 361-386.000.

Potts, Robert. Apparatus for winding an endless tape. 4,504,025, Cl. 242-55.19R.

Powers, Jerry G. Urine specimen collection apparatus with a separable compartment. 4,503,864, Cl. 128-760.000.

PPG Industries, Inc.: *See*—
Buchwalter Stephen L., 4,504,630, Cl. 525-296.000.
Krass, Dennis K.; Crano, John C.; and Newman, Melvin S., 4,504,671, Cl. 560-21.000.
Radzwill, John E.; and Bartoli, Roger F., 4,504,341, Cl. 156-102.000.

Precision Electronics, Inc.: *See*—
Janko, Mike A.; and Broberg, David K., 4,504,851, Cl. 358-10.000.

Prem, Dorothy C.: *See*—
Duke, June T.; Mazeke, Herbert F.; and Prem, Dorothy C., 4,504,605, Cl. 523-201.000.

Pressaco, Pierre: *See*—
Carre, Jean-Jacques; Pressaco, Pierre; and Mery, Jean-Claude, 4,503,949, Cl. 188-79.50P.
Riquart, Christian; Volan, Gerard; and Pressaco, Pierre, 4,503,954, Cl. 188-331.000.

Pressmaster Tool AB: *See*—
Norin, Mats; and Persson, Lars-Olov, 4,503,574, Cl. 7-107.000.

Pridgeon, Royce: *See*—
Haines, Robert C.; and Pridgeon, Royce, 4,504,345, Cl. 156-213.000.

Prior, William L.; and Sargeant, William C., to Masonite Corporation. Composition and process for forming inorganic resins and resulting product. 4,504,555, Cl. 428-689.000.

Proctor & Gamble Company, The: *See*—
Sampson, Ronald L.; and Shelton, David L., 4,504,465, Cl. 424-65.000.

Prodatek Corporation: *See*—
Pefley, Richard K.; and Pullman, James B., 4,503,832, Cl. 123-527.000.

Prohl, Hans-Rudiger; Schmidt, Bernd; and Spannehl, Hans-Peter, to Contraves GmbH. Surface structure for the drum of a recording device. 4,504,843, Cl. 346-138.000.

Prola, Luigi: *See*—
Allazzetta, Felice; and Prola, Luigi, 4,503,664, Cl. 59-16.000.

Prufer, Michael: *See*—
Bergermann, Franz; and Prufer, Michael, 4,504,825, Cl. 340-709.000.

Pruneau, Albert J.: *See*—
Gagliardo, John P.; and Pruneau, Albert J., 4,503,915, Cl. 169-15.000.

Prusak, John J.; Lock, Brian E.; and Thorn, Joseph H., to RCA Corporation. Lubricant detector and measuring device. 4,503,806, Cl. 118-712.000.

Pryor, Leroy C.: *See*—
McClelland, John R.; Wright, Wade S.; Diamond, Edward P.; Pryor, Leroy C.; and Olson, Douglas R., 4,504,957, Cl. 373-130.000.

Pryputsch, Gunter G.; Leila. Lennox M.; Parkinson, Gerald E.; and Arneson, Leonard A., to Omega Air Flow-21, Ltd. Forced convection oven. 4,503,760, Cl. 99-447.000.

PSI Associates, Inc.: *See*—
Jones, Corey N.; and Chapline, Thomas, 4,504,235, Cl. 434-219.000.

Pugh, John B. Ridge latch plate and cooperating latch pin. 4,503,651, Cl. 52-639.000.

Puleo, Joseph, Jr.: *See*—
Baldvins, Jon O.; and Puleo, Joseph, Jr., 4,504,565, Cl. 430-138.000.

Pullen, Roger J., to Schlumberger Electronics (U.K.), Ltd. Parallel motion displacement transducers. 4,503,616, Cl. 33-172.00E.

Pullman, James B.: *See*—
Pefley, Richard K.; and Pullman, James B., 4,503,832, Cl. 123-527.000.

Putsch, Siegfried: *See*—
Schippers, Heinz; Lenk, Erich; Martens, Gerhard; Mayer, Manfred; Pieper, Werner; and Putsch, Siegfried, 4,504,021, Cl. 242-18.100.

Pyle, Walter R., to Chevron Research Company. Fiber optic fuel shutoff system. 4,503,994, Cl. 222-64.000.

Quadrex HPS, Inc.: *See*—
Fowler, David E., 4,503,577, Cl. 15-88.000.

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Yant, Robert E.; and Galluch, Richard J., 4,504,456, Cl. 423-473.000.

Quee, Jack A.; and Haak, Mark P., to Dec International, Inc. Dry scrubbing oxides and particulate contaminants from hot gases. 4,504,451, Cl. 423-242.000.

Quermann, Thomas R., to Sperry Corporation. Azimuth determining gyroscope. 4,503,718, Cl. 74-5.460.

Quinlan, Kenneth P.; and Erstfeld, Thomas E., to United States of America, Air Force. Process for the epitaxial deposition of III-V compounds utilizing a binary alloy as the metallic source. 4,504,329, Cl. 148-175.000.

Rademaker, Gerrit, to U.S. Philips Corporation. Opto-electronic repeater. 4,504,974, Cl. 455-601.000.

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Suzuki, Seiichi; and Tomita, Eihachiro, 4,504,773, Cl. 320-1.000.

Radzik, William W.: *See*—
Alongi, C. J.; Miller, Jack L.; and Radzik, William W., 4,504,967, Cl. 381-65.000.

Radzwill, John E.; and Bartoli, Roger F., to PPG Industries, Inc. Fabricating shaped laminated transparencies. 4,504,341, Cl. 156-102.000.

Raleigh, Ronald G.: *See*—
Evans, Francis J.; Daubendiek, Richard L.; and Raleigh, Ronald G., 4,504,570, Cl. 430-217.000.

Ramello, Piero: *See*—
Beruto, Marco; Luzzi, Antonio; and Ramello, Piero, 4,504,572, Cl. 430-264.000.

Ramstrom, Bengt: *See*—
Anden, Bengt; Ramstrom, Bengt; and Sodergard, Bengt, 4,503,942, Cl. 187-95.000.

Ramtek Corporation: *See*—
Payne, Errol G.; McGregor, Charles D.; and Uyeda, Tim M., 4,504,160, Cl. 400-196.100.

Rathburn, Jerry L.: *See*—
Flotow, Richard A.; Rathburn, Jerry L.; and Schlosser, DeWayne F., 4,503,959, Cl. 192-70.300.

Rattunde, Manfred, to Reimers Getriebe AG. Side-bar drive chain. 4,504,255, Cl. 474-201.000.

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Raychem Corporation: *See*—
Arrington, John P., 4,504,114, Cl. 350-96.340.

Raychem Pontoise S.A.: *See*—
Dones, Roberto; and Street, David G., 4,504,699, Cl. 174-84.00R.

Raytheon Company: *See*—
Smith, Irl W., 4,504,123, Cl. 350-394.000.

Raz, Dan, to Electra Mikun (Industries) Ltd. Wheeled lifting apparatus. 4,504,041, Cl. 254-9.00R.

RCA Corporation: *See*—
Brauer, Eric A., 4,504,941, Cl. 369-170.000.
Easter, Finis C.; and Aires, Ramon H., 4,504,896, Cl. 363-21.000.
Osaka, Susumu; and Sagawa, Midori, 4,503,900, Cl. 160-172.000.
Phillips, Kevin J.; and Tracy, Terry G., 4,504,032, Cl. 244-170.000.
Prusak, John J.; Lock, Brian E.; and Thorn, Joseph H., 4,503,806, Cl. 118-712.000.
Raychaudhuri, Dipankar, 4,504,946, Cl. 370-95.000.
Wardell, Myron H., Jr., 4,504,430, Cl. 264-46.400.
Warren, Henry R., 4,504,869, Cl. 358-312.000.
Widmer, Alois E.; and Fehlmann, Roland, 4,504,521, Cl. 427-85.000.
Zelez, Joseph, 4,504,519, Cl. 427-39.000.

Ream, Stanley L., to Laser Manufacturing Technologies, Inc. Laser resonator cavity. 4,504,956, Cl. 378-107.000.

Red Arrow Products Company Inc.: *See*—
Schneck, James C.; and Ford, Patrick J., 4,504,500, Cl. 426-265.000.

Redicon Corporation: *See*—
Bulso, Joseph D., Jr.; and Doyle, Stephen D., 4,503,702, Cl. 72-349.000.

Rediger, Alvin L., to General Electric Company. Methods of manufacturing dynamoelectric machine stators. 4,503,604, Cl. 29-596.000.

Regie Nationale des Usines Renault: *See*—
Moeremans, Guy, 4,504,165, Cl. 403-129.000.

Reibling, Robert L., to Whiteway Manufacturing Co. Lighting unit for providing indirect light. 4,504,894, Cl. 362-296.000.

Reichart, Jane L.: *See*—
Koblitz, Francis F.; and Reichart, Jane L., 4,504,231, Cl. 433-228.000.

Reid, James B., to Jennings, John Edward. Gate operator apparatus. 4,503,723, Cl. 74-96.000.

Reid, Terry A.: *See*—
Stuntz, Gordon F.; and Reid, Terry A., 4,504,380, Cl. 208-113.000.

Reimer, William A., to GTE Automatic Electric Inc. Low insertion force connection arrangement. 4,504,101, Cl. 339-17.00L.

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Rattunde, Manfred, 4,504,255, Cl. 474-201.000.

Reindler, Albrecht: *See*—
Bruderle, Ernst; and Reindler, Albrecht, 4,504,912, Cl. 364-434.000.

Reiss, Leon G.: *See*—
Semones, Burley C.; and Reiss, Leon G., 4,504,755, Cl. 310-156.000.

Remet Corporation: *See*—
Feagin, Roy C., 4,504,591, Cl. 501-102.000.

Reppelin, Michel: *See*—
Jacques, Roland; Reppelin, Michel; and Seigneurin, Laurent, 4,504,595, Cl. 502-224.000.

Resch, Alois R., to Allied Corporation. Method and apparatus for mounting of electrical connectors. 4,503,610, Cl. 29-845.000.

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Rizer, Janine M.; and Gotzmer, Carl, 4,504,320, Cl. 106-98.000.

Reusswig, Gerhard H.: *See*—
Clinton, John D.; and Reusswig, Gerhard H., 4,504,172, Cl. 405-217.000.

Reynolds, Robert A., to Aalto Scientific, Ltd. Affinity immunoassay system. 4,504,585, Cl. 436-518.000.

Rhone-Poulenc Industries: *See*—
Boutin, Jean; and Neel, Jean, 4,504,643, Cl. 526-287.000.
Linguenheld, Louis; and Soula, Gerard, 4,504,682, Cl. 564-480.000.

Rhone-Poulenc Specialites Chimiques: *See*—
Jacques, Roland; Reppelin, Michel; and Seigneurin, Laurent, 4,504,595, Cl. 502-224.000.

Rhudy, John S.: *See*—
Argabright, Perry A.; and Rhudy, John S., 4,503,909, Cl. 166-252.000.

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Cantrell, John L., 4,504,473, Cl. 424-195.100.

Rice, Bradley A., to Towmotor Corporation. Hydraulic hose mounting arrangement for high-visibility mast assembly. 4,503,936, Cl. 187-9.00R.

Rice, Richard E.: *See*—
Grady, John K.; and Rice, Richard E., 4,504,859, Cl. 358-111.000.
Richard, Michael A.: *See*—
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Richard Wolf GmbH: *See*—
Boebel, Manfred, 4,503,843, Cl. 128-4.000.
Richards, Chester L., Sr. Photography printing frame. 4,504,142, Cl. 355-92.000.
Richards, Lawrence J., to Braner Enterprises. Turret stacker. 4,504,186, Cl. 414-744.00A.
Richter Gedeon Vegyeszeti Gyar Rt.: *See*—
Toth, Edit; Torley, Jozsef; Palosi, Eva; Szeberenyi, Szabolcs; Szporny, Laszlo; Gorog, Sandor; and Hajdu, Istvan, 4,504,481, Cl. 514-255.000.
Richter, Gunter: *See*—
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Ricoh Company, Ltd.: *See*—
Ebi, Yutaka; Fujii, Tadashi; Sekiya, Takuro; Horike, Masanori; Furukawa, Tatsuya; and Tachiki, Masaaki, 4,504,844, Cl. 346-140.00R.
Ogawa, Mutsuo; and Murayama, Noboru, 4,504,115, Cl. 358-260.000.
Riederer, Stephen J.; and Pelc, Norbert J., to General Electric Company. Matched filter for X-ray temporal subtraction. 4,504,908, Cl. 364-414.000.
Riegler, Ernst: *See*—
Lugscheider, Walter; Steipe, Othmar; Riegler, Ernst; and Zajicek, Ernst, 4,504,307, Cl. 75-10.00R.
Riggs, Dennis M., to Du Pont de Nemours, E. I., and Company. Process of spinning pitch-based carbon fibers. 4,504,454, Cl. 423-447.100.
Riihiluoma, Clayton; and Miller, Kurt R. Chess-like game with two vertically spaced boards. 4,504,060, Cl. 273-241.000.
Rijkeboer, Rudolf C., to Robert Bosch GmbH. Apparatus for air-injection of liquid gas. 4,503,831, Cl. 123-525.000.
Riley, Terrence H. Ditch digging machine. 4,503,630, Cl. 37-94.000.
Rindelaub, Frank: *See*—
Breuer, Hans; Rindelaub, Frank; and Velebil, Gerhard, 4,504,394, Cl. 210-632.000.
Rinesch, Rudolf, to Voest-Alpine Aktiengesellschaft. Method of operating a metallurgical plant. 4,504,308, Cl. 75-10.00R.
Riordan, Edward D.: *See*—
Szantho, Charles F.; and Riordan, Edward D., 4,504,724, Cl. 219-86.250.
Riquart, Christian; Volan, Gerard; and Pressaco, Pierre, to Societe Anonyme D.B.A. Drum brake with controlled torque and torque control valve for such a brake. 4,503,954, Cl. 188-331.000.
Ritter, Gerhard: *See*—
Schmidt, Gerhard; Ritter, Gerhard; and Ritter, Klaus, 4,503,650, Cl. 52-660.000.
Ritter, Klaus: *See*—
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Rizer, Janine M.; and Gotzmer, Carl, to Research One Limited Partnership. Light-weight cementitious product. 4,504,320, Cl. 106-98.000.
RM Industrial Products Company, Inc.: *See*—
Zucker, Jerry; Singletary, Michael P.; and Fabian, James L., 4,504,528, Cl. 427-389.800.
Robert Bosch GmbH: *See*—
Braschel, Volker; Jonner, Wolf-Dieter; and Leiber, Heinz, 4,504,911, Cl. 364-426.000.
Bube, Carsten; Thiele, Gerd; and Zeller, Hans, 4,504,732, Cl. 219-497.000.
Burkel, Rainer; Bayle, Rene ; Denamps, Jean; and Goussin, Roger, 4,504,770, Cl. 318-560.000.
Fischer, Gunter; Kotter, Wolfgang; and Laschke, Robert, 4,503,728, Cl. 74-527.000.
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Roberts, Charles C.; and Wright, Jeffrey R., to U.S. Philips Corporation. Housing for a bimetallic thermal switch. 4,504,814, Cl. 337-112.000.
Roberts, Derek A., to Rolls-Royce Limited. Turbine overspeed limiter for turbomachines. 4,503,667, Cl. 60-39.091.
Roberts, Mark G.: *See*—
Mouser, Curtis A.; Roberts, Mark G.; Haas, Daniel R.; and Lancaster, Patrick R., III, 4,503,658, Cl. 53-399.000.
Robertson, John R., to ICI Americas Inc. Polyamines and polyols containing a polysiloxane internal mold release agent for use in preparing polyurethane and polyurea resins. 4,504,313, Cl. 106-38.200.
Robinson, Melville W., Jr.: *See*—
Kapland, Mitchell A.; and Robinson, Melville W., Jr., 4,504,321, Cl. 106-117.000.
Roch, Gerald V., to Hurco Manufacturing Co., Inc. Self-adjusting gib for machine tools and the like. 4,504,096, Cl. 308-3.00A.
Rockwell International Corporation: *See*—
Armitage, Scott T., 4,504,741, Cl. 307-228.000.
Christoff, William J., 4,503,666, Cl. 60-39.070.
Davidson, Donald J.; and Sheill, David D., 4,503,946, Cl. 188-71.900.
Majewski, Lawrence M., 4,503,953, Cl. 188-330.000.
Pittenger, Robert L., 4,504,110, Cl. 350-6.300.
Rosman, Irwin E.; and Wagner, William R., 4,503,908, Cl. 165-167.000.
Sheill, David D., 4,503,595, Cl. 29-434.000.
Spence, John R.; and Yamamura, Michael M., 4,504,745, Cl. 307-473.000.
Roder, Rolf: *See*—
Heinze, Rudi; Roder, Rolf; and Feist, Wieland, 4,504,143, Cl. 356-5.000.
Rodriguez, Rudolph R.: *See*—
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Rodriguez, Vincent L.; and Rodriguez, Rudolph R. Method for magnetically separating nutshells from nutmeats. 4,504,505, Cl. 426-482.000.
Roeder, Gerald M., to United States Steel Corporation. Method for the production of spike-free sheets. 4,503,696, Cl. 72-197.000.
Rohm GmbH: *See*—
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Roland Corporation: *See*—
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Rolls-Royce Limited: *See*—
Lings, Barry W., 4,504,189, Cl. 415-115.000.
Newsam, Susan M., 4,504,346, Cl. 156-242.000.
Roberts, Derek A., 4,503,667, Cl. 60-39.091.
Romano, Salvatore, to Moore Special Tool Co., Inc. Laser path seal. 4,504,064, Cl. 277-12.000.
Rosa, Eugene J.; and Jerde, James B., to Ondyne Inc. Hygrometry probe. 4,503,707, Cl. 73-336.500.
Rosemount Inc.: *See*—
Bohn, David C., 4,503,711, Cl. 73-861.120.
Rosenbaum, Georges: *See*—
Grollier, Jean F.; Rosenbaum, Georges; Allec, Josiane; and Shroot, Braham, 4,504,494, Cl. 514-544.000.
Rosenblatt, Aaron A.: *See*—
Rosenblatt, David H.; Rosenblatt, Aaron A.; and Knapp, Joseph E., 4,504,442, Cl. 422-37.000.
Rosenblatt, David H.; Rosenblatt, Aaron A.; and Knapp, Joseph E., to Scopas Technology Corporation. Use of chlorine dioxide gas as a chemosterilizing agent. 4,504,442, Cl. 422-37.000.
Rosenblatt, Joel H., to Synthetic Sink. Low temperature engine system. 4,503,682, Cl. 60-671.000.
Rosenthal, Philip R., to Pennywise Enterprises, Inc. Photographer's diffuser light. 4,504,888, Cl. 362-18.000.
Rosman, Irwin E.; and Wagner, William R., to Rockwell International Corporation. Internally manifolded unibody plate for a plate/fin-type heat exchanger. 4,503,908, Cl. 165-167.000.
Rosner, Manfred; Urbanietz, Josef; Loewe, Heinz; Duwel, Dieter; and Kirsch, Reinhard, to Hoechst Aktiengesellschaft. Substituted benzenesulfonic esters and their use as medicaments for combatting helminths. 4,504,490, Cl. 514-483.000.
Rossie, Egbert; and Feucht, Klaus, to Audi NSU Auto Union AG. Guidance system for window panes of vehicles. 4,503,639, Cl. 49-374.000.
Roth, Donals J.; Kubis, Charles S.; and Walter, John, to Continental Packaging Company, Inc. Drawn can for food and the like. 4,503,990, Cl. 220-276.000.
Rothenbacher, Peter; and Vomhoff, Erich, to Schwabische Huttenwerke GmbH. Arrangement for manufacturing or treating web material. 4,503,626, Cl. 34-110.000.
Roto-Master, Inc.: *See*—
MacInnes, Hugh; Meyer, Jon A.; Johnston, Andrew E.; and Fort, John W., Jr., 4,504,187, Cl. 415-1.000.
Rotondo, Philip L.; and Rotondo, Thomas J. Method for making reinforced concrete products. 4,504,428, Cl. 264-34.000.
Rotondo, Thomas J.: *See*—
Rotondo, Philip L.; and Rotondo, Thomas J., 4,504,428, Cl. 264-34.000.
Rowe International, Inc.: *See*—
Steiner, Larry E., 4,503,963, Cl. 194-4.00C.
Rudzena, William L.; Frederick, Warren P.; and Stone, Albert, to Baxter Travenol Laboratories, Inc. Chambers to assure reliable infusion of medicaments and the like. 4,504,265, Cl. 604-86.000.
Rueter, John C.: *See*—
Markowitz, Harold T.; Rueter, John C.; and Syring, Gary J., 4,503,858, Cl. 128-419.0PT.
Ruggieri, Joseph A., to Chip Supply. Time-to-voltage converter. 4,504,155, Cl. 368-121.000.
Ruhle, Wolfgang, to Siemens Aktiengesellschaft. Pressure sensor. 4,503,709, Cl. 73-727.000.
Ruhrchemie Aktiengesellschaft: *See*—
Gartner, Roderich; Cornils, Boy; Bexten, Ludger; and Kupies, Dieter, 4,504,588, Cl. 502-24.000.
Ruhrtal-Elektrizitatsgesellschaft Hartig GmbH & Co.: *See*—
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Rundzaitis, Alfons, to Associated Mills, Inc. Water filter. 4,504,389, Cl. 210-266.000.
Runyan, Ralph D.: *See*—
Brand, Robert D.; and Runyan, Ralph D., 4,503,740, Cl. 83-521.000.
Russell, Carl D. Pumping unit and reversing valve and method of operating. 4,504,197, Cl. 417-404.000.
Ruti-te Strake B.V.: *See*—
van Mullekom, Hubert P., 4,503,889, Cl. 139-1.00R.
Rutledge, Donald R., to AT&T Bell Laboratories. Apparatus for directly converting thermal to rotational energy. 4,503,676, Cl. 60-527.000.
Rutsch, Werner: *See*—
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Ruzicka, Jaromir: *See*—
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Ryan, Patrick J.: *See*—
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Ryan, Robert C., to Shell Oil Company. Hydrodenitrification catalyst and a method for improving the activity of the catalyst. 4,504,589, Cl. 502-66.000.

Ryba, Chester. Band saw with tilt and slide frame and quick release vise. 4,503,743, Cl. 83-801.000.

Ryowa Engineering Company, Limited: *See*—
Yamada, Kazuo; and Sakaki, Hiroshi, 4,504,223, Cl. 432-225.000.

S.N.E.C.M.A.: *See*—
Francois, Yves-Marie M. R.; and Vergnes, Jean-Claude, 4,503,670, Cl. 60-39.281.

Sabia, Angelo J.: *See*—
Pines, Arthur N.; and Sabia, Angelo J., 4,504,549, Cl. 428-447.000.

Sachleben, Harold G., Sr., to Allied Corporation. Reel assembly and clamping device. 4,504,085, Cl. 285-119.000.

Saegusa, Yasuyoshi, to Sumitomo Electric Industries, Ltd. Sintered rotor for a rotary pump and a manufacturing method for the rotor. 4,504,202, Cl. 418-150.000.

Saeman, Walter C., to Olin Corporation. Continuous process for producing granular calcium hypochlorite particles. 4,504,457, Cl. 423-474.000.

SAES Getters SpA: *See*—
della Porta, Paolo, 4,504,765, Cl. 313-481.000.

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Sahara, Masayoshi: *See*—
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Saheki, Takasi: *See*—
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St. Pierre, Raymond M.: *See*—
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Saita, Koji: *See*—
Sakamoto, Yasuhiro; Saita, Koji; and Kojima, Akihiro, 4,504,764, Cl. 313-403.000.

Saito, Kenichi: *See*—
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Saito, Kimitaka: *See*—
Obayashi, Hideki; Kohama, Tokio; Saito, Kimitaka; Kawai, Hisasi; and Ina, Toshikazu, 4,503,713, Cl. 73-862.340.

Saito, Kiyotaka: *See*—
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Saito, Syuichiro, to Canon Kabushiki Kaisha. Image sensing apparatus. 4,504,866, Cl. 358-213.000.

Saito, Taiji; Kato, Mitsuhisa; and Yasunaga, Kimioki, to Toyota Jidosha Kabushiki Kaisha. Oil cooler system for motor vehicles with turbo chargers. 4,503,679, Cl. 60-605.000.

Sakagami, Teruo: *See*—
Doi, Hideaki; Kokubun, Kenichi; Sakagami, Teruo; and Murayama, Naohiro, 4,504,631, Cl. 525-327.300.

Sakai, Masao; Suzuki, Yasuhiko; and Sugimoto, Makoto, to NGK Spark Plug Co., Ltd. Resistor composition for resistor-incorporated spark plugs. 4,504,411, Cl. 252-506.000.

Sakai, Nobuo: *See*—
Yoshida, Yoshinobu; Sakai, Nobuo; and Ishikawa, Takatoshi, 4,504,577, Cl. 430-564.000.

Sakaki, Hiroshi: *See*—
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Sakaki, Yasuo: *See*—
Yagyu, Takashi; Yamaguchi, Takeshi; Tanaka, Sotaro; and Sakaki, Yasuo, 4,504,185, Cl. 414-700.000.

Sakakibara, Naoji: *See*—
Amano, Hiroyuki; and Sakakibara, Naoji, 4,504,756, Cl. 310-168.000.

Sakakibara, Shinsuke: *See*—
Inaba, Hajimu; and Sakakibara, Shinsuke, 4,504,771, Cl. 318-561.000.

Sakamoto, Kazuho, to Matsushita Electric Industrial Co., Ltd. Electronic digital timer. 4,504,716, Cl. 219-10.55B.

Sakamoto, Noboru: *See*—
Miyashita, Tsuneo; Sakamoto, Noboru; and Fukuyo, Hiroshi, 4,504,306, Cl. 75-3.000.

Sakamoto, Teruhisa; and Nakamura, Shigeo, to Toyo Soda Manufacturing Co., Ltd. Process for producing methacrylic acid. 4,504,677, Cl. 562-534.000.

Sakamoto, Yasuhiro; Saita, Koji; and Kojima, Akihiro, to Sony Corporation. Cathode ray tube with color selecting grill. 4,504,764, Cl. 313-403.000.

Sakano, Tomiaki: *See*—
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Sakurai, Itaru: *See*—
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Sallay, Stephen I. Method for flame retarding material with ammonium-triborate. 4,504,546, Cl. 428-375.000.

Sampson, Ronald L.; and Shelton, David L., to Proctor & Gamble Company, The. Cosmetic sticks. 4,504,465, Cl. 424-65.000.

Sampson, Stephen A.; and Olson, Thor F., to Molex Incorporated. Method of making a circuit assembly. 4,503,611, Cl. 29-845.000.

Sams, Marvin W.; and Wasson, Samuel L., to Bio-Scan, Inc. Electroencephalography electrode assembly. 4,503,860, Cl. 128-639.000.

San/Bar Corporation: *See*—
McIntyre, Donald J., 4,503,578, Cl. 15-104.165.

Sano, Takeshi: *See*—
Kamei, Ryosuke; Tanaka, Toyoaki; Sano, Takeshi; and Kotani, Masataka, 4,504,432, Cl. 264-177.00F.

Sano, Tsutomu: *See*—
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Santrade Ltd.: *See*—
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Sanwa Chemical Industries, Inc., Ltd.: *See*—
Inui, Emiko; Iwano, Takao; Hara, Seishi; Mikami, Yukio; Kurita, Hideo; and Aoki, Yoshiaki, 4,504,433, Cl. 264-232.000.

Sargeant, William C.: *See*—
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Sartorius GmbH: *See*—
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Sasaki, Isao: *See*—
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Shiga, Akinobu; Sasaki, Toshio; and Kojima, Junpei, 4,504,637, Cl. 526-119.000.

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Nakanishi, Masayuki; Tsuruzoe, Hirohisa; Sato, Humiyuki; and Hashimoto, Tokuo, 4,504,763, Cl. 313-318.000.

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Inomata, Koichiro; Tateishi, Hiroshi; Higashinakagawa, Emiko; and Sato, Kanemitsu, 4,504,327, Cl. 148-31.550.

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Taga, Yasunori; and Sawada, Yutaka, 4,504,109, Cl. 350-1.600.

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Takagi, Hirofumi; Kunugita, Kiyohiko; Sawai, Hideki; and Kariyone, Kazuo, 4,504,471, Cl. 514-18.000.

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Gaehring, David P.; and Scanlon, John V., 4,504,504, Cl. 426-321.000.

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Haddad, James H.; and Schatz, Klaus W., 4,504,291, Cl. 55-319.000.

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Vioia, Frank J.; Schaub, Erwin L.; and Burke, Lawrence H., 4,504,816, Cl. 337-255.000.

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Scheffee, Robert S., to Atlantic Research Corporation. Coal-water fuel slurries and process for making same. 4,504,277, Cl. 44-51.000.

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McCombie, Stuart W.; Ganguly, Ashit K.; and Girijavallabhan, Viyyoor M., 4,504,485, Cl. 514-192.000.

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Efner, Howard F.; and Schiff, Sidney, 4,504,280, Cl. 44-63.000.

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Cervenec, Stephen W.; and Stender, Ronald L., 4,503,937, Cl. 187-29.00R.

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Schippers, Heinz; Lenk, Erich; Martens, Gerhard; Mayer, Manfred; Pieper, Werner; and Putsch, Siegfried, to Barmag Barmer Maschinenfabrik AG. Ribbon free wound yarn package and method and apparatus for producing the same. 4,504,021, Cl. 242-18.100.

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Doerges, Alexander; Schlauer, Johann; Kriebel, Manfred; and Hude, Anton, 4,504,449, Cl. 423-228.000.

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Flotow, Richard A.; Rathburn, Jerry L.; and Schlosser, DeWayne F., 4,503,959, Cl. 192-70.300.

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Pullen, Roger J., 4,503,616, Cl. 33-172.00E.

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Baak, Tryggve, 4,504,113, Cl. 350-96.330.
Vigneaux, Pierre, 4,503,712, Cl. 73-861.350.

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Schmidt, Henning: *See*—
Goller, Ernst; Kazmaier, Gunther; Trissler, Hans-Dieter; and Schmidt, Henning, 4,503,689, Cl. 66-149.00R.

Schmitt, Kirk D., to Mobil Oil Corporation. Polymeric pyrrolidinium methanesulfonate viscosifiers and method for manufacture. 4,504,622, Cl. 525-61.000.

Schmoger, Gerhard: *See*—
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Schnabel, Rolf; Kissau, Gerd; Weitz, Hans-Martin; and Fischer, Rolf, to BASF Aktiengesellschaft. Preparation of diacyloxybutenes. 4,504,676, Cl. 560-244.000.

Schneck, James C.; and Ford, Patrick J., to Red Arrow Products Company Inc. Method of coating a shirred casing strand with smoke flavor. 4,504,500, Cl. 426-265.000.

Schneider, George N., Jr.: *See*—
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Schneider, Karl U.: *See*—
Elter, Claus; Schneider, Karl U.; Schoning, Josef; Stach, Heinrich; and Stracke, Wilfried, 4,504,439, Cl. 376-391.000.

Schneider, Michael J., to Bendix Corporation. Diesel fuel system. 4,503,825, Cl. 123-446.000.

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Holbein, Hans-Jurgen; Leiderer, Paul; and Schneider, Walter, 4,504,357, Cl. 162-123.000.

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Schoen, Klaus-Peter, to Hoechst Aktiengesellschaft. Liquid developer device. 4,503,805, Cl. 118-649.000.

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Schofield, John, to U.S. Philips Corporation. SAW Device with special length-weighted interdigital electrode array. 4,504,759, Cl. 310-313.00C.

Scholl, Hans, to Kochs Adler AG. Automatic sewing machines. 4,503,789, Cl. 112-121.140.

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Schouteeten, Alain; and Christidis, Yani, to Societe Francaise Hoechst. Pure crystalline racemic sodium parahydroxymandelate, process for its preparation and uses thereof. 4,504,678, Cl. 562-470.000.

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Besecke, Siegmund; Siegert, Hermann-Josef; and Schroder, Gunter, 4,504,675, Cl. 560-233.000.

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Brown, Omar L.; Peters, Don B.; and Schubert, James R., 4,503,989, Cl. 220-269.000.

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Oexler, Rudolf, 4,503,663, Cl. 57-404.000.

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Burckhardt, Manfred; and Schulte, Herbert, 4,503,944, Cl. 188-71.600.

Schumacher, Heinz O. Apparatus for the treatment of flaky or granulated material with gases or vapors in a continuous countercurrent process. 4,503,627, Cl. 34-173.000.

Schumacher, Rolf; and Grubenmann, Arnold, to Ciba-Geigy Corporation. Lubricant compositions containing chlorinated organic compounds. 4,504,404, Cl. 252-33.400.

Schust, Gerhard, to Brose Fahrzeugteile GmbH & Co. Window lifter drive for motor vehicles and the like. 4,503,732, Cl. 74-625.000.

Schutten, Herman P.: *See*—
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Schwartz, Arnold; Grupp, Ingrid L.; Grupp, Gunter; and de Pover, Alain. Method of administering calcium channel blocking agents. 4,504,476, Cl. 514-211.000.

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Hartman, Robert L.; Koszi, Louis A.; and Schwartz, Bertram, 4,504,952, Cl. 372-45.000.

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Spratt, James P., 4,504,757, Cl. 310-308.000.

Sciortino, Joseph. Modular block structures for breakwaters, harbor dams and the like. 4,503,649, Cl. 52-593.000.

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Klar, Erhard; Hashiguchi, Don H.; and Dietrich, Ronald J., 4,504,597, Cl. 502-225.000.
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Scocca, Peter M. Method for reduction of sulfur content in exit gases. 4,503,785, Cl. 110-342.000.

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Rosenblatt, David H.; Rosenblatt, Aaron A.; and Knapp, Joseph E., 4,504,442, Cl. 422-37.000.

Scott, Edward S.: *See*—
Polen, Karl L.; and Scott, Edward S., 4,503,921, Cl. 177-147.000.

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Forquer, William F., 4,503,899, Cl. 160-133.000.

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Heuschen, Jean M. H.; Bussink, Jan; and Sederel, Willem L., 4,504,623, Cl. 525-67.000.
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Segawa, Hirohisa: *See*—
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Segawa, Makoto; and Ariizumi, Shoji, to Tokyo Shibaura Denki Kabushiki Kaisha. Semiconductor buffer circuit using enhancement-mode, depletion-mode and zero threshold mode transistors. 4,504,746, Cl. 307-475.000.

Seibel, Robert V.: *See*—
Winschel, Richard E., deceased; Heil, Fred B.; and Seibel, Robert V., 4,504,217, Cl. 431-183.000.

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Sekimoto, Souichi; and Kato, Ryoki, to Fuji Xerox Co., Ltd. One-dimensional liquid crystal scanner. 4,504,119, Cl. 350-336.000.
Sekiya, Takuro: *See*—
Ebi, Yutaka; Fujii, Tadashi; Sekiya, Takuro; Horike, Masanori; Furukawa, Tatsuya; and Tachiki, Masaaki, 4,504,844, Cl. 346-140.00R.
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Serizawa, Moriyoshi; and Hakamada, Haruo, to Konishiroku Photo Industry Co., Ltd. Photographic paper rolling apparatus. 4,504,026, Cl. 242-71.100.
Severens, Gerhard: *See*—
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Sextro, Gunter: *See*—
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Sharp, Bernard C., to Parker-Hannifin Corporation. Wiper blade coupling structure. 4,503,580, Cl. 15-250.320.
Sharp, Bernard C., to Parker-Hannifin Corporation. Rearview mirror positionable by remote control. 4,504,116, Cl. 350-637.000.
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Sherman, Earle C., to Manville Service Corporation. Method of gluing end flaps of a package in an in-line packaging machine. 4,503,659, Cl. 53-491.000.
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Shiba, Haruo: *See*—
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Shiba, Kazuo; Takahashi, Masao; Kanai, Akira; and Koizumi, Kouichi, to Citizen Watch Company Limited. Micro-adjustable displacement and rotation setting apparatus. 4,504,048, Cl. 269-71.000.
Shibata, Kenichi: *See*—
Hara, Sadao; Moritani, Hiroaki; Kaga, Hisashi; Minaki, Toshihiro; Shibata, Kenichi; Ogawa, Junichi; and Umino, Kaoru, 4,504,527, Cl. 427-318.000.
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Shikama, Takashi; Yamamoto, Tomoyuki; and Takaoka, Yuichi, to Murata Manufacturing Co., Ltd. Demagnetizing circuit using a PTC thermistor device. 4,504,817, Cl. 338-23.000.
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Shimano Industrial Company Limited: *See*—
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Shimanuki, Koji: *See*—
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Shimizu, Hiroshi, to Ushio Denki Kabushiki Kaisha. Method for heating semiconductor wafer by means of application of radiated light. 4,504,730, Cl. 219-411.000.
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Shiozawa, Takao, to Konishiroku Photo Industry Co., Ltd. Paper feeding means for recording apparatus. 4,504,053, Cl. 271-34.000.
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Sidney, James T. Infant trainer seat. 4,503,571, Cl. 4-254.000.
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Cecere, Mirella; Gozzo, Franco; and Signorini, Ernesto, 4,504,303, Cl. 71-76.000.

Silberman, Chaim: *See*—
Tessler, Moshe; Silberman, Chaim; and Zollman, Richard, 4,503,687, Cl. 63-28.000.

Silfvast, William T.: *See*—
Macklin, John J.; Silfvast, William T.; and Wood, Obert R., II, 4,504,955, Cl. 372-76.000.

Sill, Brian E.: *See*—
Galus, Dean M.; and Sill, Brian E., 4,504,233, Cl. 434-45.000.

Silva, Ralph: *See*—
Moliman, Robert E.; and Silva, Ralph, 4,504,431, Cl. 264-105.000.

Simeth, Claus: *See*—
Herzel, Joachim; Simeth, Claus; Mitze, Rudolf; and Ortner, Robert, 4,503,771, Cl. 101-247.000.

Simons, Michael J.: *See*—
Clark, Bernard A.; Simons, Michael J.; and Holstead, Colin, 4,504,568, Cl. 430-203.000.

Simplex Wire & Cable Company: *See*—
Fontaine, Gregory N.; and Traut, Richard T., 4,504,695, Cl. 174-21.00R.

Simpson, Harold G., to Encon Products, Inc. Structural bracing system. 4,503,653, Cl. 52-664.000.

Simpson, William E., Jr., to Lockheed Corporation. Flow limiting selector valve. 4,503,886, Cl. 137-596.000.

Singer Company, The: *See*—
Cook, Albert N., 4,503,792, Cl. 112-220.000.
Galus, Dean M.; and Sill, Brian E., 4,504,233, Cl. 434-45.000.
Killinger, Karl H., 4,503,791, Cl. 112-199.000.
Meacham, Thomas E., Jr., 4,503,883, Cl. 137-458.000.
Odermann, Charles R., 4,503,793, Cl. 112-262.100.

Singh, Baldev: *See*—
Lesher, George Y.; and Singh, Baldev, 4,504,482, Cl. 514-275.000.

Singletary, Michael P.: *See*—
Zucker, Jerry; Singletary, Michael P.; and Fabian, James L., 4,504,528, Cl. 427-389.800.

Sirakawa, Tsutomu: *See*—
Yonezawa, Keitaro; and Sirakawa, Tsutomu, 4,504,046, Cl. 269-24.000.

Sitko, Jerry A.; Hrynkiw, John; and Brazeau, Marilyn I. Detachable cover for disposable drinking cups, container and the like. 4,503,992, Cl. 220-90.400.

Sivaslian, Armen H.: *See*—
Bartholet, Stephen J.; and Sivaslian, Armen H., 4,503,924, Cl. 180-8.600.

Siwiak, Kazimierz: *See*—
Garay, Oscar M.; Siwiak, Kazimierz; and Balzano, Quirino, 4,504,834, Cl. 343-749.000.

Skalicky, Stanislav: *See*—
Sorm, Miloslav; Langpaul, Josef; Ulbert, Karel; Kadlec, Karel; Skalicky, Stanislav; Brazdil, Miroslav; Nespurek, Stanislav; Kensa, Jaromir; Zvonicek, Miroslav; and Hrdina, Zdenek, 4,503,996, Cl. 222-321.000.

Skloss, Louis C. Tortilla making apparatus. 4,504,209, Cl. 425-397.000.

Slaughter, Grimes G. Signal detector. 4,504,786, Cl. 324-78.00R.

Slechta, Leo J., Jr.: *See*—
Manning, Bennett W.; Slechta, Leo J., Jr.; and Wen, Kuo Y., 4,504,907, Cl. 364-200.000.

Slotboom, Jan W.: *See*—
Harwig, Hendrik A.; Slotboom, Jan W.; and Pelgrom, Marcellinus J. M., 4,504,930, Cl. 365-238.000.

Slovenska vysoka skola technicka v Bratislava: *See*—
Tkac, Alexander; and Cvenglos, Jan, 4,504,361, Cl. 202-172.000.

Smagin, Vladimir I.: *See*—
Vinogradov, Viktor N.; and Smagin, Vladimir I., 4,503,901, Cl. 164-212.000.

Small, Tony M.: *See*—
Smith, Harry D., Jr.; Small, Tony M.; and Deaton, John G., 4,504,736, Cl. 250-256.000.

Smeltzer, Eugene E.; Ichikawa, Yoshio; and Schneider, George N., Jr., to Westinghouse Electric Corp. Encapsulation of boric acid slurries. 4,504,317, Cl. 106-90.000.

Smit, Arie; and Marcus, Johannes W., to Estel Hoogovens B.V. Support for cylindrical objects such as rolled coils. 4,503,978, Cl. 211-13.000.

Smith, Daniel G., to Upright, Inc. Steering system. 4,504,074, Cl. 280-93.000.

Smith, Donald F., Jr.: *See*—
Weber, Robert J., Jr.; and Smith, Donald F., Jr., 4,504,635, Cl. 525-450.000.

Smith Engineering: *See*—
Smith, Jay, III; and Karr, Gerald S., 4,504,062, Cl. 273-313.000.

Smith, Gilbert L.; Swanson, David L.; and Trick, Gilbert. Baking oven. 4,503,837, Cl. 126-190.000.

Smith, Harry D., Jr.; Small, Tony M.; and Deaton, John G., to Halliburton Company. Gamma ray spectral tool for borehole use. 4,504,736, Cl. 250-256.000.

Smith, Irl W., to Raytheon Company. High efficiency polarizing beam-splitter. 4,504,123, Cl. 350-394.000.

Smith, Jay, III; and Karr, Gerald S., to Smith Engineering. Digital watch having matrix display for arcade-like game playing. 4,504,062, Cl. 273-313.000.

Smith, John W., to Memphis State University. Production of hydrocarbons. 4,504,282, Cl. 48-197.00R.

Smith, Michael D.; Olesin, Andrew S.; and Whatley, Roger A., to Motorola, Inc. Input buffer circuit for receiving multiple level input voltages. 4,504,747, Cl. 307-475.000.

Smith and Nephew Associated Companies p.l.c.: *See*—
Howes, John G. B., 4,504,405, Cl. 252-106.000.

Smith, Phillip R.: *See*—
Carlisle, Thomas A.; Smith, Phillip R.; and Thorn, Frank H., deceased, 4,504,286, Cl. 55-20.000.

Smith, Raymond C. Apparatus and method for force feeding air to a carburetor used with an internal combustion engine. 4,503,671, Cl. 60-274.000.

Snap-on Tools Corporation: *See*—
Nelsen, Richard C.; Wridt, Alfred A.; and Fuhreck, John E., 4,503,619, Cl. 33-181.0AT.

Snyder Industries, Inc.: *See*—
Snyder, Larry L., 4,504,535, Cl. 428-137.000.

Snyder, Larry L., to Snyder Industries, Inc. Fastening ring insert for a molded plastic article. 4,504,535, Cl. 428-137.000.

Snyder, Stephen J.: *See*—
Marshall, G. June; and Snyder, Stephen J., 4,504,493, Cl. 514-738.000.

Sobajima, Yoshihiro: *See*—
Yui, Hiroshi; Sobajima, Yoshihiro; Higashide, Osamu; Imamura, Tsuyoshi; Okamura, Michiya; and Hattori, Satoru, 4,504,617, Cl. 524-426.000.

Societe Anonyme D.B.A.: *See*—
Carre, Jean-Jacques; Pressaco, Pierre; and Mery, Jean-Claude, 4,503,949, Cl. 188-79.50P.
Morin, Gerard, 4,504,166, Cl. 403-147.000.
Riquart, Christian; Volan, Gerard; and Pressaco, Pierre, 4,503,954, Cl. 188-331.000.

Societe Anonyme De Telecommunications: *See*—
Beaudet, Didier, 4,504,976, Cl. 455-611.000.

S.A. des Ateliers Houget Duesberg Bosson: *See*—
Kunig, Helmut, 4,503,589, Cl. 19-129.00R.

Societe Anonyme dite: Etude et Realisation de Chaines Automatiques ERCA: *See*—
Hautemont, Jean-Claude H., 4,503,656, Cl. 53-396.000.

Societe Anonyme dite: L'Oreal: *See*—
Grollier, Jean F.; Rosenbaum, Georges; Allec, Josiane; and Shroot, Braham, 4,504,494, Cl. 514-544.000.

Societe Anonyme: Leisystem: *See*—
Maurin, Suzanne M., 4,503,797, Cl. 114-106.000.

Societe Europeenne de Propulsion: *See*—
Battarel, Andre P.; and Lequin, Claude G., 4,504,098, Cl. 308-10.000.

Societe Francaise Hoechst: *See*—
Schouteeten, Alain; and Christidis, Yani, 4,504,678, Cl. 562-470.000.

Societe Nationale Industrielle Aerospatiale: *See*—
Mouille, Rene L., 4,504,193, Cl. 416-140.000.

Sodeco-Saia AG: *See*—
Jauch, Karl, 4,504,084, Cl. 283-94.000.

Sodergard, Bengt: *See*—
Anden, Bengt; Ramstrom, Bengt; and Sodergard, Bengt, 4,503,942, Cl. 187-95.000.

Soga, Tasao: *See*—
Kushima, Tadao; Gooda, Masahiro; Soga, Tasao; and Yamamoto, Toshitaka, 4,503,597, Cl. 29-569.00R.

Solid State Chargers Research and Development Limited Partnership: *See*—
Hoffman, Philip A., 4,504,774, Cl. 320-9.000.

Sony Corporation: *See*—
Matsumoto, Hiroyuki; and Kato, Toshio, 4,504,848, Cl. 357-24.000.
Sakamoto, Yasuhiro; Saita, Koji; and Kojima, Akihiro, 4,504,764, Cl. 313-403.000.

Soodak, Charles I.: *See*—
Gould, Gordon; Soodak, Charles I.; and Thompson, Robert E., 4,504,112, Cl. 350-96.230.

Sorensen, Gunnar; and Svendsen, Leo G., to A/S Neselco. Xerographic method for dry sensitization and electroless coating of an insulating surface and a powder for use with the method. 4,504,529, Cl. 427-437.000.

Sorm, Miloslav; Langpaul, Josef; Ulbert, Karel; Kadlec, Karel; Skalicky, Stanislav; Brazdil, Miroslav; Nespurek, Stanislav; Kensa, Jaromir; Zvonicek, Miroslav; and Hrdina, Zdenek, to Ceskoslovenska akademie ved. Liquid atomizer having a double-acting pump. 4,503,996, Cl. 222-321.000.

Soula, Gerard: *See*—
Linguenheld, Louis; and Soula, Gerard, 4,504,682, Cl. 564-480.000.

Spannehl, Hans-Peter: *See*—
Prohl, Hans-Rudiger; Schmidt, Bernd; and Spannehl, Hans-Peter, 4,504,843, Cl. 346-138.000.

Spatz, David M., to Chevron Research Company. Certain N,N-di-substituted-pyridine carboxamides, fungicidal compositions and fungicidal method of use. 4,504,484, Cl. 514-357.000.

Spears, Harry L. Fluid pump. 4,504,199, Cl. 417-456.000.

Spector, George: *See*—
Klutz, Nathaniel, Jr.; and Spector, George, 4,504,407, Cl. 252-162.000.

Speedgrip Chuck, Inc.: *See*—
Norton, Gerald W., 4,504,070, Cl. 279-1.00C.

Spellman, Gordon B.: *See*—
Cartz, Louis; Weiss, Arnold; Schutten, Herman P.; Spellman, Gordon B.; Jaskolski, Stanley V.; and Wackman, Peter H., deceased, 4,504,964, Cl. 378-119.000.

Spence, John R.; and Yamamura, Michael M., to Rockwell International Corporation. Clocked tri-state driver circuit. 4,504,745, Cl. 307-473.000.

Spencer, Donald M.: *See*—
Wieland, Kurt H.; Spencer, Donald M.; and Kinsell, Robert C., 4,503,683, Cl. 62-86.000.

Speraggi, Marcello, to Honeywell Information Systems Italia. Serial printer provided with cutter. 4,504,162, Cl. 400-621.000.

Sperry Corporation: *See*—
Currie, Thomas P.; and Zbinden, Terry B., 4,504,156, Cl. 374-45.000.
Hanson, David G.; and Francis, Robert E., 4,504,827, Cl. 340-723.000.
Manning, Bennett W.; Slechta, Leo J., Jr.; and Wen, Kuo Y., 4,504,907, Cl. 364-200.000.
Naaktgeboren, Adrianus, 4,503,762, Cl. 100-4.000.
Quermann, Thomas R., 4,503,718, Cl. 74-5.460.
Swartz, Harold L.; Hoogervorst, Thomas R.; and Lane, Lynn R., 4,503,622, Cl. 33-366.000.
Zbinden, Terry B., 4,504,782, Cl. 324-73.0PC.

Spils, Richard W. Angle globe valve. 4,503,884, Cl. 137-553.000.

Spils, Richard W. Multiple stage valve. 4,504,040, Cl. 251-121.000.

Spit Pit, Inc.: *See*—
Dawson, Patricia S., 4,503,572, Cl. 4-258.000.

Spraco, Inc.: *See*—
Huffman, David C., 4,504,013, Cl. 239-424.000.

Spratt, James P., to Science Applications, Inc. Contact-charge motor and generator. 4,504,757, Cl. 310-308.000.

Spurrier, Francis R.; DeZubay, Egon A.; Murray, Alexander P.; and Vidt, Edward J., to United States of America, Energy. Slab reformer. 4,504,447, Cl. 422-204.000.

Stach, Heinrich: *See*—
Elter, Claus; Schneider, Karl U.; Schoning, Josef; Stach, Heinrich; and Stracke, Wilfried, 4,504,439, Cl. 376-391.000.

Stahl, Bernhard; and Bohm, Horst, to Optima-Spanntechnik GmbH, Firma. Bracing device for machine tools. 4,503,725, Cl. 74-424.80B.

Stahl, Karl-Heinz; and Fend, Fritz, to Stahl, Karl Heinz. Control valve for a burner with shutoff characteristics. 4,504,214, Cl. 431-121.000.

Stahl, Karl Heinz: *See*—
Stahl, Karl-Heinz; and Fend, Fritz, 4,504,214, Cl. 431-121.000.

Stamicarbon, B.V.: *See*—
van de Leemput, Lambertus J. M. A.; Nooijen, Godefridus A. H.; and van der Loo, Hendrikus W., 4,504,592, Cl. 502-104.000.

Stancati, Nicholas T.: *See*—
Garner, Peter; Stancati, Nicholas T.; and Szostak, Tadeusz, 4,503,744, Cl. 83-879.000.

Standard Oil Company, The: *See*—
Cirjak, Larry M.; and Sutherland, Lynne, 4,504,371, Cl. 204-158.00R.
Desmond, Michael J.; and Pepera, Marc A., 4,504,590, Cl. 502-73.000.
Duke, June T.; Mazeke, Herbert F.; and Prem, Dorothy C., 4,504,605, Cl. 523-201.000.
Fox, Joseph R.; and Pesa, Frederick A., 4,504,684, Cl. 568-454.000.

Stang, Hans-Peter; and Fischer, Dieter. Thread feed mechanism and method for textile machines. 4,504,022, Cl. 242-47.010.

Stapp, Paul R., to Phillips Petroleum Company. Surfactant and process for enhanced oil recovery. 4,504,399, Cl. 252-8.55D.

Stark, Terrence L.; and Ludecke, Otto A., to General Motors Corporation. Diesel exhaust cleaner with glow plug igniters and flow limiting valve. 4,503,672, Cl. 60-286.000.

Starkey, Stanley V.: *See*—
Applegate, Barry G.; and Starkey, Stanley V., 4,503,965, Cl. 198-347.000.

Starting Industry Company Limited: *See*—
Nishio, Tadashi, 4,503,958, Cl. 192-12.00R.

Stauffer Chemical Company: *See*—
Aliberto, Ellen S.; Corbett, Constance R.; and McIntyre, Randall S., 4,504,510, Cl. 426-553.000.
DiSalvo, Anthony L.; and Tsai, Chung-Chieh, 4,504,633, Cl. 525-438.000.

Steel Heddle Mfg. Co.: *See*—
Kramer, Charles F., 4,503,890, Cl. 139-92.000.

Steensen, Wayne L.: *See*—
Danielson, Robert L.; Bosco, Peter M.; and Steensen, Wayne L., 4,504,512, Cl. 426-579.000.

Steffen, Peter. Selectable filter assembly. 4,504,390, Cl. 210-333.100.

Steigerwald, Robert L., to General Electric Company. Regulated dc-dc converter using a resonating transformer. 4,504,895, Cl. 363-17.000.

Steiner, Larry E., to Rowe International, Inc. Control circuit for bill and coin changer. 4,503,963, Cl. 194-4.00C.

Steipe, Othmar: *See*—
Lugscheider, Walter; Steipe, Othmar; Riegler, Ernst; and Zajicek, Ernst, 4,504,307, Cl. 75-10.00R.

Stemer, Jacques: *See*—
Bouzard, Daniel; Weber, Abraham; and Stemer, Jacques, 4,504,657, Cl. 544-30.000.

Stender, Ronald L.: *See*—
Cervenec, Stephen W.; and Stender, Ronald L., 4,503,937, Cl. 187-29.00R.

Stenlund, Stig, to Hep Products AB. Sealing device between movable parts. 4,504,069, Cl. 277-174.000.

Stephanus, Donald J.: *See*—
Stephanus, Tony L.; and Stephanus, Donald J., 4,503,934, Cl. 184-1.500.

Stephanus, Tony L.; and Stephanus, Donald J. Drain plug with disengagement sealing means. 4,503,934, Cl. 184-1.500.

Stephen, John F.: *See*—
Nelson, Richard V.; and Stephen, John F., 4,504,664, Cl. 546-243.000.

Stepinski, Janusz: *See*—
Folkers, Karl; Bowers, Cyril Y.; Kubiak, Teresa M.; and Stepinski, Janusz, 4,504,414, Cl. 260-112.5LH.

Sterling Drug Inc.: *See*—
Lesher, George Y.; and Singh, Baldev, 4,504,482, Cl. 514-275.000.

Stern, Melvin J. Unitized construction for sliding closures and method for making. 4,503,640, Cl. 49-425.000.

Steuer, Robert R.; and Harris, David H., to ValleyLab, Inc. Flow rate monitor with optical sensing chamber. 4,504,263, Cl. 604-65.000.

Stevens, Charles G., to United States of America, Energy. Apparatus for generating coherent infrared energy of selected wavelength. 4,504,953, Cl. 372-56.000.

Stevenson, John: *See*—
Barker, Sidney A.; Baggett, Neil; Stevenson, John; and deCourcy, David R., 4,504,314, Cl. 106-38.350.

Stofko, John, to Carbocol Inc. Apparatus for converting a conduction press for consolidation of products by heat and pressure to a convection press. 4,504,205, Cl. 425-181.000.

Stone, Albert: *See*—
Rudzena, William L.; Frederick, Warren P.; and Stone, Albert, 4,504,265, Cl. 604-86.000.

Stone, Thomas W., to Universal Electric Company. Electric motor. 4,504,754, Cl. 310-90.000.

STORAGE Technology Partners: *See*—
Zasio, John; Elvey, Dwight; and Tanizawa, Ronald, 4,504,783, Cl. 324-73.00R.

Stordahl, Calmer M.: *See*—
Chana, Howard E.; and Stordahl, Calmer M., 4,504,247, Cl. 474-17.000.

Stork, Gilbert: *See*—
Evers, William J.; Stork, Gilbert; Mookherjee, Braja D.; and Heinsohn, Howard H., Jr., 4,504,398, Cl. 252-8.600.

Stothers, William R. Extraction of elemental sulphur from sulphur compound gases. 4,504,459, Cl. 423-573.00G.

Stracke, Wilfried: *See*—
Elter, Claus; Schneider, Karl U.; Schoning, Josef; Stach, Heinrich; and Stracke, Wilfried, 4,504,439, Cl. 376-391.000.

Strandberg, Gustaf S.: *See*—
Dyren, Karl E. A.; and Strandberg, Gustaf S., 4,504,386, Cl. 209-254.000.

Strang, Donald P., to McGraw-Edison Company. Energy saving wound core transformer. 4,504,813, Cl. 336-216.000.

Straub, Robert P. Motor vehicle camping device. 4,504,049, Cl. 296-165.000.

Strecker, Helmut: *See*—
Timpl, Rupert; Brocks, Dietrich; Neubauer, Horst; and Strecker, Helmut, 4,504,587, Cl. 436-538.000.

Street, David G.: *See*—
Dones, Roberto; and Street, David G., 4,504,699, Cl. 174-84.00R.

Strolle, Clifford H.: *See*—
Cluff, Stephen L.; and Strolle, Clifford H., 4,504,620, Cl. 524-602.000.

Strong, John R., to Paccar Inc. Sway bag suspension system. 4,504,079, Cl. 280-683.000.

Structural Fibers, Inc.: *See*—
Bliley, Ward L., 4,504,530, Cl. 428-35.000.

Stuber, Wayne G.: *See*—
Newton, Charles L.; and Stuber, Wayne G., 4,504,296, Cl. 62-31.000.

Stuckey, William C. Post and cantelevered ring plant/vine support structure. 4,503,636, Cl. 47-44.000.

Studer, Rolf: *See*—
Felix, Arthur M.; Gillessen, Dieter; Studer, Rolf; Meienhofer, Johannes A.; and Trzeciak, Arnold, 4,504,415, Cl. 260-112.50R.

Stuntz, Gordon F.; and Schucker, Robert C., to Exxon Research and Engineering Co. Passivation of metal contaminants in cat cracking. 4,504,379, Cl. 208-113.000.

Stuntz, Gordon F.; and Reid, Terry A., to Exxon Research and Engineering Co. Passivation of metal contaminants in cat cracking. 4,504,380, Cl. 208-113.000.

Stunzi, Joseph M., to Westinghouse Electric Corp. Cable operated tap changer for a three-phase transformer. 4,504,811, Cl. 336-10.000.

Stut, Hans, to Fuji Electronic Components Ltd. Microwave power generator with dual coaxial lines connected to transistor. 4,504,801, Cl. 331-117.00D.

Such, Christopher H.: *See*—
Irvine, Antony J.; Leary, Bruce; and Such, Christopher H., 4,504,618, Cl. 524-457.000.

Suciu, George D.: *See*—
Chen, Jamin; Khonsari, Ali M.; and Suciu, George D., 4,504,364, Cl. 203-45.000.

Sudo, Yoshimi: *See*—
Kuwabara, Hideki; Yoshimura, Shohei; Yamaguchi, Toru; and Sudo, Yoshimi, 4,504,601, Cl. 521-58.000.
Kuwabara, Hideki; Yoshimura, Shohei; Yamaguchi, Toru; and Sudo, Yoshimi, 4,504,653, Cl. 528-491.000.

Sueishi, Motoharu; and Nakamura, Mitsuo, to Nippondenso Co., Ltd. Fuel injection system for internal combustion engine. 4,503,827, Cl. 123-478.000.
Suga, Masaaki: *See—*
Suzuki, Tadashi; Morimoto, Yoshiro; Hamada, Hideo; Suga, Masaaki; and Murasugi, Takashi, 4,503,956, Cl. 192-3.310.
Sugano, Katsumi: *See—*
Kurumaji, Masanobu; Takeuchi, Naoki; Kondo, Hiroaki; Akita, Toshiaki; Sano, Tsutomu; and Sugano, Katsumi, 4,504,208, Cl. 425-589.000.
Sugimoto, Makoto: *See—*
Sakai, Masao; Suzuki, Yasuhiko; and Sugimoto, Makoto, 4,504,411, Cl. 252-506.000.
Sugimoto, Yutaka; Taira, Kenji; and Fukushima, Akira, to Kabushiki Kaisha Komatsu Seisakusho. Noise suppressing, air cooled enclosure for an engine. 4,503,931, Cl. 181-204.000.
Sugitani, Sinzi: *See—*
Yoshikawa, Isao; Tanimizu, Tooru; and Sugitani, Sinzi, 4,504,885, Cl. 361-342.000.
Sugizaki, Yasushi: *See—*
Onodera, Hiromi; Wakabayashi, Noriaki; Yamada, Kiichiro; and Sugizaki, Yasushi, 4,504,750, Cl. 310-12.000.
Suied, Joseph P. Boring devices. 4,503,919, Cl. 175-269.000.
Sukimoto, Yasuyuki; and Nagao, Toshiaki, to Omron Tateisi Electronics Co. Temperature control device. 4,504,010, Cl. 236-46.00F.
Suld, George: *See—*
Lyons, James E.; Suld, George; and Shinn, Robert W., 4,504,672, Cl. 560-131.000.
Sulser, Ueli: *See—*
Zabel, Lutz D.; Widmer, Jurg; and Sulser, Ueli, 4,504,647, Cl. 528-68.000.
Sulzer Brothers Limited: *See—*
Mandrin, Charles, 4,504,460, Cl. 423-580.000.
Sumitani, Sinya: *See—*
Miyaki, Masahiko; Matsumura, Toshimi; Masuda, Akira; Sumitani, Sinya; Hasegawa, Takashi; and Hayakawa, Takahiro, 4,503,821, Cl. 123-357.000.
Sumitomo Chemical Company, Limited: *See—*
Shiga, Akinobu; Sasaki, Toshio; and Kojima, Junpei, 4,504,637, Cl. 526-119.000.
Sumitomo Electric Industries, Ltd.: *See—*
Saegusa, Yasuyoshi, 4,504,202, Cl. 418-150.000.
Yokota, Minoru; Murakami, Kazuhito; and Takahashi, Kenichi, 4,504,298, Cl. 65-3.110.
Sumitomo Metal Industries, Ltd.: *See—*
Yamaoka, Hideyuki; Hatano, Michiharu; Miyazaki, Tomio; Shimoda, Teruhisa; and Oki, Koji, 4,504,043, Cl. 266-160.000.
Sumitomo Rubber Industries, Inc.: *See—*
Kurahashi, Koichiro, 4,504,520, Cl. 427-44.000.
Sump, Cord H., to Combustion Engineering, Inc. Process for bonding refractory to surfaces. 4,504,440, Cl. 419-3.000.
Sun, Ming, to Abbott Laboratories. Stabilized peroxidase compositions. 4,504,579, Cl. 435-28.000.
Sunakawa, Kiyoshi; and Maruyama, Shinichi, to Toshiba Kikai Kabushiki Kaisha; and Netsu Kogyo Kabushiki Kaisha. Drying apparatus with deodorizing system for a printing machine. 4,504,220, Cl. 432-72.000.
Sundt, Peter C., to Metrix Instrument Co. Geophone having a non-conductive coilform. 4,504,932, Cl. 367-183.000.
Sung, Rodney L., to Texaco Inc. Corrosion inhibited motor fuel. 4,504,278, Cl. 44-53.000.
Sung, Rodney L. Corrosion inhibited motor fuel. 4,504,279, Cl. 44-53.000.
Suntech, Inc.: *See—*
Lyons, James E.; Suld, George; and Shinn, Robert W., 4,504,672, Cl. 560-131.000.
Superfos A/S: *See—*
Knudsen, Knud C. B., 4,504,458, Cl. 423-552.000.
Superior Finishers, Incorporated: *See—*
Charvat, Vernon K., 4,504,283, Cl. 51-298.000.
Susaki, Wataru: *See—*
Hirano, Ryoichi; Namizaki, Hirofumi; Susaki, Wataru; and Tanaka, Toshio, 4,504,328, Cl. 148-171.000.
Sutherland, Lynne: *See—*
Cirjak, Larry M.; and Sutherland, Lynne, 4,504,371, Cl. 204-158.00R.
Sutton, Bill E. Precision saw. 4,503,742, Cl. 83-781.000.
Sutton, Roger D.: *See—*
Parmelee, William H.; and Sutton, Roger D., 4,504,267, Cl. 604-134.000.
Suzuki, Atsushi: *See—*
Ninomiya, Masakazu; Suzuki, Atsushi; and Kawashima, Yutaka, 4,503,824, Cl. 123-436.000.
Suzuki, Isao; Arai, Yoshio; and Kataoka, Hiroyuki, to Fuji Xerox Co., Ltd. Rectangular pattern recognition apparatus. 4,504,969, Cl. 382-10.000.
Suzuki, Masuo: *See—*
Nakayama, Satoshi; Takeuchi, Hideaki; Murota, Junichi; Hurukado, Tatuhiko; Takeda, Shigeru; Suzuki, Masuo; Kurokawa, Harushige; and Ikeda, Humihide, 4,503,807, Cl. 118-719.000.
Suzuki, Nobuhiko: *See—*
Araki, Shigeru; and Suzuki, Nobuhiko, 4,504,910, Cl. 364-424.000.
Suzuki, Seiichi; and Tomita, Eihachiro, to Kureha Kagaku Kogyo Kabushiki Kaisha; and Radio Research Technical, Inc. Capacitor discharge circuit. 4,504,773, Cl. 320-1.000.
Suzuki, Tadashi; Morimoto, Yoshiro; Hamada, Hideo; Suga, Masaaki; and Murasugi, Takashi, to Nissan Motor Company, Limited. Lock-up control device and method for lock-up type automatic transmission. 4,503,956, Cl. 192-3.310.
Suzuki, Takeo; Matsumoto, Itsuro; Yurita, Yoshihiro; and Zenpo, Hideharu, to Kabushiki Kaisha Yaskawa Denki Seisakusho. Arm operating device in automatic operating machine. 4,503,722, Cl. 74-96.000.
Suzuki, Takeshi: *See—*
Nishida, Toyomi; Suzuki, Takeshi; Hatamori, Takashi; and Terada, Sei, 4,504,020, Cl. 241-121.000.
Suzuki, Taro: *See—*
Tsunemi, Kazumasa; Suzuki, Taro; and Yamamoto, Yoshiichi, 4,504,636, Cl. 526-67.000.
Suzuki, Yasuhiko: *See—*
Sakai, Masao; Suzuki, Yasuhiko; and Sugimoto, Makoto, 4,504,411, Cl. 252-506.000.
Suzuki, Yasuo: *See—*
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Suzuki, Yoshihisa: *See—*
Horiuchi, Mitsunori; Suzuki, Yoshihisa; Yasui, Yoshiharu; and Seiki, Kazuo, 4,503,662, Cl. 57-261.000.
Suzuki, Yutaka: *See—*
Nakamura, Tetsuya; Hobo, Nobuhito; Tsuzuki, Yoshihiko; Suzuki, Yutaka; Haseda, Satoshi; and Masuda, Akira, 4,503,830, Cl. 123-501.000.
Svendsen, Leo G.: *See—*
Sorensen, Gunnar; and Svendsen, Leo G., 4,504,529, Cl. 427-437.000.
Swan, Charles A., to Windows, Inc. Shallow double hung window. 4,503,641, Cl. 49-445.000.
Swann, Wayne E., to Genex Corporation. Vermiculite as a carrier support for immobilized biological materials. 4,504,582, Cl. 435-108.000.
Swanson, David L.: *See—*
Smith, Gilbert L.; Swanson, David L.; and Trick, Gilbert, 4,503,837, Cl. 126-190.000.
Swartz, Harold L.; Hoogervorst, Thomas R.; and Lane, Lynn R., to Sperry Corporation. Precision inclinometer with digital numerical readout. 4,503,622, Cl. 33-366.000.
Swartzbaugh, Peter T.; and Hehl, Edward M., to Owens-Illinois, Inc. Tamper indicating package with large diameter opening. 4,503,985, Cl. 215-252.000.
Swede, Harald G.: *See—*
Edebo, Lars B.; Swede, Harald G.; and Tornqvist, Nils-Erik, 4,503,873, Cl. 134-104.000.
Sybron Corporation: *See—*
Walsh, William J., 4,504,733, Cl. 219-521.000.
Synfina, S.A.: *See—*
Louvier, Yvon, 4,504,436, Cl. 264-321.000.
Synthetic Sink: *See—*
Rosenblatt, Joel H., 4,503,682, Cl. 60-671.000.
SyQuest Technology: *See—*
Toldi, George; Nigam, Anil; and Crain, Ronald A., 4,504,879, Cl. 360-105.000.
Syrbius, Gerhard: *See—*
Koch, Klaus; and Syrbius, Gerhard, 4,503,764, Cl. 100-117.000.
Syring, Gary J.: *See—*
Markowitz, Harold T.; Rueter, John C.; and Syring, Gary J., 4,503,858, Cl. 128-419.0PT.
Systems and Support, Incorporated: *See—*
Jahr, Ronald S.; and Cowell, Thomas H., 4,504,831, Cl. 340-870.030.
Syva Company: *See—*
Khanna, Pyare, 4,504,413, Cl. 260-112.00R.
Szantho, Charles F.; and Riordan, Edward D., to Joyal Products, Inc. Fusing machine. 4,504,724, Cl. 219-86.250.
Szeberenyi, Szabolcs: *See—*
Toth, Edit; Torley, Jozsef; Palosi, Eva; Szeberenyi, Szabolcs; Szporny, Laszlo; Gorog, Sandor; and Hajdu, Istvan, 4,504,481, Cl. 514-255.000.
Szostak, Tadeusz: *See—*
Garner, Peter; Stancati, Nicholas T.; and Szostak, Tadeusz, 4,503,744, Cl. 83-879.000.
Szporny, Laszlo: *See—*
Toth, Edit; Torley, Jozsef; Palosi, Eva; Szeberenyi, Szabolcs; Szporny, Laszlo; Gorog, Sandor; and Hajdu, Istvan, 4,504,481, Cl. 514-255.000.
T-Bar Incorporated: *See—*
Wakuluk, Augustine, 4,504,102, Cl. 339-18.00R.
Tabak, Samuel A.; Wright, Bernard S.; and Owen, Hartley, to Mobil Oil Corporation. Catalytic conversion of olefins to heavier hydrocarbons. 4,504,693, Cl. 585-520.000.
Tachiki, Masaaki: *See—*
Ebi, Yutaka; Fujii, Tadashi; Sekiya, Takuro; Horike, Masanori; Furukawa, Tatsuya; and Tachiki, Masaaki, 4,504,844, Cl. 346-140.00R.
Tada, Yoshikazu, to Hayashikane Shipbuilding & Engineering Co. Ltd. Control apparatus for dental gas burner. 4,504,212, Cl. 431-86.000.
Tadokoro, Kazushige: *See—*
Uchida, Susumu; and Tadokoro, Kazushige, 4,504,883, Cl. 361-119.000.
Taga, Yasunori; and Sawada, Yutaka, to Kabushiki Kaisha Toyota Chuo Kenkyusho. Infrared shielding lamination. 4,504,109, Cl. 350-1.600.

Taira, Kenji: *See*—
Sugimoto, Yutaka; Taira, Kenji; and Fukushima, Akira, 4,503,931, Cl. 181-204.000.
Taisan Industrial Co., Ltd.: *See*—
Toyoda, Akira; and Chiba, Yasutsune, 4,504,198, Cl. 417-417.000.
Tajima, Osamu, to Victor Company of Japan, Limited. Device for feedback controlling focus of an optical system in an information recording/reproducing apparatus. 4,504,938, Cl. 369-45.000.
Takabe, Katsunori, to Mitsubishi Denki Kabushiki Kaisha. Supervisory apparatus for elevators. 4,503,941, Cl. 187-29.00R.
Takagi, Hirofumi; Kunugita, Kiyohiko; Sawai, Hideki; and Kariyone, Kazuo, to Fujisawa Pharmaceutical Co., Ltd. Animal growth promotant and method of use for animal growth. 4,504,471, Cl. 514-18.000.
Takahashi, Kenichi: *See*—
Yokota, Minoru; Murakami, Kazuhito; and Takahashi, Kenichi, 4,504,298, Cl. 65-3.110.
Takahashi, Masao: *See*—
Shiba, Kazuo; Takahashi, Masao; Kanai, Akira; and Koizumi, Kouichi, 4,504,048, Cl. 269-71.000.
Takahashi, Susumu: *See*—
Ueyanagi, Kiichi; Takahashi, Susumu; Umemoto, Yasunari; and Nakamura, Michiharu, 4,503,599, Cl. 29-571.000.
Takahashi, Yasushi: *See*—
Nagano, Katsuyuki; Takahashi, Yasushi; Takasaki, Yoshitaka; and Tanaka, Mitsuo, 4,504,943, Cl. 370-79.000.
Takaishi, Naotake; Inamoto, Yoshiaki; Urata, Kouichi; Kawano, Junichi; and Tsutsumi, Hisao, to Kao Soap Co., Ltd. 2,3-Dialkoxypropyl glyceryl ether and its preparation process as well as cosmetic composition containing same. 4,504,464, Cl. 424-63.000.
Takamatsu, Shuichi, to Daikin Kogyo Co., Ltd. Process for preparing 1,1,2-trifluoro-2-chloroethyl difluoromethyl ether. 4,504,686, Cl. 568-684.000.
Takamatsu, Takeshi, deceased: *See*—
Tsukaya, Takashi; and Takamatsu, Takeshi, deceased, 4,503,841, Cl. 128-4.000.
Takamatsu, Tokuyuki, legal representative: *See*—
Tsukaya, Takashi; and Takamatsu, Takeshi, deceased, 4,503,841, Cl. 128-4.000.
Takanashi, Akihiro: *See*—
Hosaka, Sumio; Takanashi, Akihiro; Kurosaki, Toshiei; Kuniyoshi, Shinji; Kawamura, Yoshio; and Terasawa, Tsuneo, 4,504,726, Cl. 219-121.0LH.
Takaoka, Yuichi: *See*—
Shikama, Takashi; Yamamoto, Tomoyuki; and Takaoka, Yuichi, 4,504,817, Cl. 338-23.000.
Takasaki, Yoshitaka: *See*—
Nagano, Katsuyuki; Takahashi, Yasushi; Takasaki, Yoshitaka; and Tanaka, Mitsuo, 4,504,943, Cl. 370-79.000.
Takaya, Takao; Tsutsumi, Hideo; Yasuda, Nobuyuki; and Matsuda, Keiji, to Fujisawa Pharmaceutical Co., Ltd. 1,4-Diaminocyclitol derivatives. 4,504,472, Cl. 514-36.000.
Takayama, Hiroshi: *See*—
Tanaka, Koichi; Takayama, Hiroshi; Amagai, Yoshimi; Aonuma, Shigeo; and Fukase, Yasuji, 4,504,563, Cl. 430-109.000.
Takayama, Syuichi, to Olympus Optical Co., Ltd. Endoscope apparatus with electric deflection mechanism. 4,503,842, Cl. 128-4.000.
Takeda Chemical Industries, Ltd.: *See*—
Furukawa, Yoshiyasu, 4,504,662, Cl. 544-255.000.
Imada, Akira; Kintaka, Kazuhiko; and Shinagawa, Susumu, 4,504,655, Cl. 536-18.700.
Kudo, Shiro; and Mukaiyama, Megumi, 4,504,514, Cl. 426-634.000.
Uda, Yoshiaki; and Yashiki, Takatsuka, 4,504,470, Cl. 514-19.000.
Takeda Riken Co., Ltd.: *See*—
Yoshida, Kenji, 4,504,749, Cl. 307-590.000.
Takeda, Shigeru: *See*—
Nakayama, Satoshi; Takeuchi, Hideaki; Murota, Junichi; Hurukado, Tatuhiko; Takeda, Shigeru; Suzuki, Masuo; Kurokawa, Harushige; and Ikeda, Humihide, 4,503,807, Cl. 118-719.000.
Takemae, Yoshihiro; Ohira, Tsuyoshi; and Enomoto, Seiji, to Fujitsu Limited. Dynamic semiconductor memory device. 4,504,929, Cl. 365-210.000.
Takeno, Hidekazu: *See*—
Kitaura, Yoshihiko; Nakaguchi, Osamu; Hemmi, Keiji; Aratani, Matsuhiko; Takeno, Hidekazu; Okada, Satoshi; Tanaka, Hirokazu; Hashimoto, Masashi; Kuroda, Yoshio; Iguchi, Eiko; Kohsaka, Masanobu; Aoki, Hatsuo; and Imanaka, Hiroshi, 4,504,584, Cl. 435-253.000.
Takenouchi, Osamu; Nguyen Chanh, Khe; Kawara, Tatsuo; and Tanaka, Hisami, to Dainippon Ink and Chemicals, Inc. Electrophotoconductor for electrophotography comprising a disazo compound. 4,504,560, Cl. 430-72.000.
Takeuchi, Hideaki: *See*—
Nakayama, Satoshi; Takeuchi, Hideaki; Murota, Junichi; Hurukado, Tatuhiko; Takeda, Shigeru; Suzuki, Masuo; Kurokawa, Harushige; and Ikeda, Humihide, 4,503,807, Cl. 118-719.000.
Takeuchi, Naoki: *See*—
Kurumaji, Masanobu; Takeuchi, Naoki; Kondo, Hiroaki; Akita, Toshiaki; Sano, Tsutomu; and Sugano, Katsumi, 4,504,208, Cl. 425-589.000.
Taki, Hiromitsu: *See*—
Mihara, Toshihiro; Kusuda, Takao; Noma, Koichi; and Taki, Hiromitsu, 4,504,218, Cl. 431-326.000.
Takumi, Hiroshi, to Shinko Kikaikogyo Kabushiki Kaisha. Spring manufacturing machine equipped with two motors. 4,503,694, Cl. 72-131.000.
Talalay, Anselm. Tab applying method and apparatus. 4,504,336, Cl. 156-64.000.
Tamai, Hideo; and Fujisawa, Kyuichi, to Alps Electric Co., Ltd. Multicolor pen recorder. 4,504,838, Cl. 346-46.000.
Tamai, Masayoshi: *See*—
Iyoda, Tetsuo; and Tamai, Masayoshi, 4,504,839, Cl. 346-75.000.
Tamburelli, Giovanni, to CSELT - Centro Studi e Laboratori Telecomunicazioni S.P.A. Equalizer for the correction of digital signals. 4,504,958, Cl. 375-12.000.
Tamoto, Koji: *See*—
Ishikawa, Shun-ichi; Nagano, Teruo; Tamoto, Koji; and Shinozaki, Fumiaki, 4,504,573, Cl. 430-288.000.
Tamura, Mitsuo: *See*—
Ida, Jinsei; Fujita, Tsutomu; Matsuo, Kenzaburo; Higuchi, Fumio; and Tamura, Mitsuo, 4,503,596, Cl. 29-568.000.
Tamura, Shingo: *See*—
Nishiguchi, Takashi; and Tamura, Shingo, 4,504,940, Cl. 369-126.000.
Tan, Toshimi: *See*—
Yoshioka, Takatoshi; Kirihara, Seishin; Siga, Masao; Yoshida, Takehiko; Hisano, Katsukuni; Tan, Toshimi; and Kobayashi, Masahiro, 4,504,554, Cl. 428-683.000.
Tanaka, Hideaki; Fujita, Kunihiro; and Ushiroda, Mitsuhiro, to Mitsuboshi Belting Ltd. Power transmission belt. 4,504,258, Cl. 474-263.000.
Tanaka, Hirokazu: *See*—
Kitaura, Yoshihiko; Nakaguchi, Osamu; Hemmi, Keiji; Aratani, Matsuhiko; Takeno, Hidekazu; Okada, Satoshi; Tanaka, Hirokazu; Hashimoto, Masashi; Kuroda, Yoshio; Iguchi, Eiko; Kohsaka, Masanobu; Aoki, Hatsuo; and Imanaka, Hiroshi, 4,504,584, Cl. 435-253.000.
Tanaka, Hisami: *See*—
Takenouchi, Osamu; Nguyen Chanh, Khe; Kawara, Tatsuo; and Tanaka, Hisami, 4,504,560, Cl. 430-72.000.
Tanaka, Junkichi, to Tanaka Shikan Kabushiki Kaisha. Method of making a paper tube. 4,504,261, Cl. 493-273.000.
Tanaka, Koichi; Takayama, Hiroshi; Amagai, Yoshimi; Aonuma, Shigeo; and Fukase, Yasuji, to Fuji Xerox Co., Ltd. Toner for developing electrostatic latent image containing copolymer of vinyl compound and acid monomer. 4,504,563, Cl. 430-109.000.
Tanaka, Minoru; Kawabe, Tadashi; and Kobune, Masafumi, to Tateho Kagaku Kogyo Kabushiki Kaisha. Method of manufacturing crystalline silicon carbide. 4,504,453, Cl. 423-345.000.
Tanaka, Mitsuhiro: *See*—
Akiyama, Junichiro; Tanaka, Mitsuhiro; and Moriuchi, Yoshihisa, 4,504,215, Cl. 431-168.000.
Tanaka, Mitsuo: *See*—
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Tanaka Shikan Kabushiki Kaisha: *See*—
Tanaka, Junkichi, 4,504,261, Cl. 493-273.000.
Tanaka, Shinichi; Matsuda, Ikuo; Hirose, Namio; and Kobayashi, Kazutsugu, to Matsushita Electric Industrial Co., Ltd. Optical signal reproducing apparatus. 4,504,934, Cl. 369-18.000.
Tanaka, Sotaro: *See*—
Yagyu, Takashi; Yamaguchi, Takeshi; Tanaka, Sotaro; and Sakaki, Yasuo, 4,504,185, Cl. 414-700.000.
Tanaka, Tatsumi; Hikita, Kiyoshi; Furuhashi, Masaru; Hatada, Toshio; Nakano, Katsuzi; and Arai, Akira, to Hitachi, Ltd. Heat exchanger coated with aqueous coating composition. 4,503,907, Cl. 165-133.000.
Tanaka, Toshio: *See*—
Hirano, Ryoichi; Namizaki, Hirofumi; Susaki, Wataru; and Tanaka, Toshio, 4,504,328, Cl. 148-171.000.
Tanaka, Toyoaki: *See*—
Kamei, Ryosuke; Tanaka, Toyoaki; Sano, Takeshi; and Kotani, Masataka, 4,504,432, Cl. 264-177.00F.
Tanaka, Yoshiaki: *See*—
Kitamura, Masatsugu; Inami, Mamoru; Tanaka, Yoshiaki; and Otsuki, Zenju, 4,504,870, Cl. 360-25.000.
Tandy Corporation: *See*—
Leininger, Steven, 4,504,826, Cl. 340-721.000.
Taniguchi, Koichi: *See*—
Okatsuka, Hisashi; Taniguchi, Koichi; Konno, Mitsuo; and Narita, Ryuho, 4,504,718, Cl. 219-10.55B.
Tanimizu, Tooru: *See*—
Yoshikawa, Isao; Tanimizu, Tooru; and Sugitani, Sinzi, 4,504,885, Cl. 361-342.000.
Tanizawa, Ronald: *See*—
Zasio, John; Elvey, Dwight; and Tanizawa, Ronald, 4,504,783, Cl. 324-73.00R.
Tao, Deh C.: *See*—
Evans, Julie F.; Findlay, Hugh T.; Popyach, Stephen A.; and Tao, Deh C., 4,504,840, Cl. 346-76.0PH.
Tateho Kagaku Kogyo Kabushiki Kaisha: *See*—
Tanaka, Minoru; Kawabe, Tadashi; and Kobune, Masafumi, 4,504,453, Cl. 423-345.000.
Tateishi, Hiroshi: *See*—
Inomata, Koichiro; Tateishi, Hiroshi; Higashinakagawa, Emiko; and Sato, Kanemitsu, 4,504,327, Cl. 148-31.550.
Tautfest, Rexford L. Grain drill with sealed bin air-powered distribution. 4,503,786, Cl. 111-86.000.

Taylor, Benson T., Jr.; and Hawkins, Ralph G., to General Electric Company. Door latch and method of assembly. 4,504,719, Cl. 219-10.55C.
Taylor, Kennard W., to Cameron Iron Works, Inc. Choke valve. 4,503,878, Cl. 137-315.000.
Taylor, William E.: *See*—
Levie, Stephen A.; and Taylor, William E., 4,504,767, Cl. 315-101.000.
TDK Corporation: *See*—
Okamura, Masatoshi; and Shiba, Haruo, 4,504,027, Cl. 242-74.100.
Teleflex Incorporated: *See*—
Irvin, John E., 4,503,730, Cl. 74-566.000.
Telefunken Electronic GmbH: *See*—
Gillessen, Klaus; Mischel, Peter; and Malinowski, Christopher, 4,504,740, Cl. 250-578.000.
Krumrein, Gerhard, 4,504,820, Cl. 340-81.00R.
Telettra-Telefonia Elettronica E Radio S.p.A.: *See*—
Zingrini, Carlo; and Oreglio, Maurizio, 4,504,107, Cl. 339-125.00R.
Terada, Sei: *See*—
Nishida, Toyomi; Suzuki, Takeshi; Hatamori, Takashi; and Terada, Sei, 4,504,020, Cl. 241-121.000.
Terakura, Yukio: *See*—
Ikemoto, Kazuhito; Terakura, Yukio; and Miyake, Takashi, 4,503,957, Cl. 192-4.00C.
Terasawa, Tsuneo: *See*—
Hosaka, Sumio; Takanashi, Akihiro; Kurosaki, Toshiei; Kuniyoshi, Shinji; Kawamura, Yoshio; and Terasawa, Tsuneo, 4,504,726, Cl. 219-121.0LH.
Terazono, Masami: *See*—
Hasegawa, Mineo; Yoshida, Kazuya; Miyauchi, Sakae; and Terazono, Masami, 4,504,583, Cl. 435-206.000.
Terui, Sadao: *See*—
Ono, Tetsuji; Ichihara, Shoichi; Ohata, Tomohisa; and Terui, Sadao, 4,504,598, Cl. 502-303.000.
Tesmann, Holger: *See*—
Hempel, Hans-Ulrich; Grunert, Margarete; Tesmann, Holger; and Muller, Heinz, 4,504,410, Cl. 252-358.000.
Tessler, Moshe; Silberman, Chaim; and Zollman, Richard. Means for and processes of mounting gem stone clusters. 4,503,687, Cl. 63-28.000.
Tewes, Udo: *See*—
Volke, Hans-Werner; Hilkenmeier, Jurgen; Kohlhage, Hermann; and Tewes, Udo, 4,504,161, Cl. 400-605.000.
Texaco Inc.: *See*—
Mead, Theodore C.; and Wright, James H., 4,504,376, Cl. 208-25.000.
Sung, Rodney L., 4,504,278, Cl. 44-53.000.
Texas Instruments Incorporated: *See*—
Orcutt, John W., 4,504,435, Cl. 264-272.170.
Schaake, Herbert F.; Tregilgas, John H.; and Beck, Jeffrey D., 4,504,334, Cl. 148-191.000.
Textron, Inc.: *See*—
Bert, Stephen F., 4,503,665, Cl. 59-82.000.
Yax, Michael J., 4,503,613, Cl. 51-284.00E.
Thayne, Stephen W., to Computer Election Systems. Dual throat data registering apparatus and card therefor. 4,504,735, Cl. 235-50.00A.
Thiele, Gerd: *See*—
Bube, Carsten; Thiele, Gerd; and Zeller, Hans, 4,504,732, Cl. 219-497.000.
Thiokol Corporation: *See*—
Boliceau, Christopher W., 4,503,773, Cl. 102-202.000.
Thomas & Betts Corporation: *See*—
Garner, Peter; Stancati, Nicholas T.; and Szostak, Tadeusz, 4,503,744, Cl. 83-879.000.
Greenwood, William S., 4,504,698, Cl. 174-66.000.
Thomas, E. Raymond; Cahill, Lysle D.; Tibbits, John L.; Fraser, Kenneth D.; Keane, John F.; Harting, Stanley C.; Kramer, George H.; Duke, Ronald J.; Kessis, Theodore A.; Butler, John C.; Frank, Gary L.; and Lawson, John A., to Coulter Systems Corporation. Digital plate maker system and method. 4,504,126, Cl. 350-469.000.
Thomas J. Lipton, Inc.: *See*—
Binley, Gary N., 4,504,511, Cl. 426-565.000.
Thomas, Jean-Claude, to Aluminium Pechiney. Heating apparatus for circulatory-firing open baking furnaces and process for use of the apparatus. 4,504,219, Cl. 432-4.000.
Thomas, John J., to American Greetings Corporation. Hand puppet with detachable facial elements. 4,504,240, Cl. 446-100.000.
Thompson, Robert E.: *See*—
Gould, Gordon; Soodak, Charles I.; and Thompson, Robert E., 4,504,112, Cl. 350-96.230.
Thomson-CSF: *See*—
Gauthier, Francis; and Dubos, Jacques, 4,504,300, Cl. 65-10.100.
Lacoste, Jean P., 4,504,863, Cl. 358-167.000.
Plouviez, Eric, 4,504,800, Cl. 331-1.00A.
Thordarson, Gunnar G., to U.S. Philips Corporation. Electromagnetic proximity fuse. 4,503,775, Cl. 102-214.000.
Thorn, Carl L., Ernest F. Thorn, Alexandra L. Thorn, heirs: *See*—
Carlisle, Thomas A.; Smith, Phillip R.; and Thorn, Frank H., deceased, 4,504,286, Cl. 55-20.000.
Thorn, Frank H., deceased: *See*—
Carlisle, Thomas A.; Smith, Phillip R.; and Thorn, Frank H., deceased, 4,504,286, Cl. 55-20.000.
Thorn, Joseph H.: *See*—
Prusak, John J.; Lock, Brian E.; and Thorn, Joseph H., 4,503,806, Cl. 118-712.000.
Thune-Eureka A/S: *See*—
Eriksen, Gunnar, 4,504,359, Cl. 162-274.000.
Tibbits, John L.: *See*—
Thomas, E. Raymond; Cahill, Lysle D.; Tibbits, John L.; Fraser, Kenneth D.; Keane, John F.; Harting, Stanley C.; Kramer, George H.; Duke, Ronald J.; Kessis, Theodore A.; Butler, John C.; Frank, Gary L.; and Lawson, John A., 4,504,126, Cl. 350-469.000.
Tibolla, Julius F.: *See*—
Fiumefreddo, John; and Tibolla, Julius F., 4,504,108, Cl. 339-128.000.
Timpl, Rupert; Brocks, Dietrich; Neubauer, Horst; and Strecker, Helmut, to Hoechst Aktiengesellschaft. Procedure for immunologic determination of procollagen peptide (type III) and procollagen peptide col 1 (type III) together and a process for preparing anti-procollagen peptide col 1 (type III) serum. 4,504,587, Cl. 436-538.000.
Ting Enterprises, Inc.: *See*—
Evans, Jeffrey L., 4,503,836, Cl. 126-135.000.
Tinios, Pantelis G.: *See*—
Lawrence, Fitzroy L.; and Tinios, Pantelis G., 4,503,939, Cl. 187-29.00R.
Tippins, George W.; and Ginzburg, Vladimir B., to Tippins Machinery Company, Inc. Method for hot rolling slabs. 4,503,697, Cl. 72-202.000.
Tippins Machinery Company, Inc.: *See*—
Tippins, George W.; and Ginzburg, Vladimir B., 4,503,697, Cl. 72-202.000.
Titz, Siegfried; Langel, Matthias; Wissinger, Waldemar; and Kurth, Josef, to Dynamit Nobel Aktiengesellschaft. Die for extruder. 4,504,210, Cl. 425-461.000.
Tjurkina, Ljudmila P.: *See*—
Motov, David L.; Tjurkina, Ljudmila P.; Godneva, Maria M.; Kolesnikova, Nina I.; Yakusheva, Galina G.; Ivanovich, Metelkin A., deceased; and Fedorovna, Chibisova N., administrator, 4,504,271, Cl. 8-94.250.
Tkac, Alexander; and Cvengros, Jan, to Slovenska vysoka skola technicka v Bratislava. Block short-way evaporator with wiped-off film. 4,504,361, Cl. 202-172.000.
Todt, William H.: *See*—
Underwood, Richard H.; and Todt, William H., 4,504,437, Cl. 376-153.000.
Tokico Ltd.: *See*—
Imaizumi, Tomio, 4,503,951, Cl. 188-280.000.
Tokunaga, Yoshikuni; and Yamada, Masato, to Nippon Steel Corporation. Method for the production of cold rolled steel sheet having super deep drawability. 4,504,326, Cl. 148-12.00C.
Tokyo Shibaura Denki Kabushiki: *See*—
Nii, Riro; Toyoda, Nobuyuki; and Hojo, Akimichi, 4,503,600, Cl. 29-571.000.
Tokyo Shibaura Denki Kabushiki Kaisha: *See*—
Inomata, Koichiro; Tateishi, Hiroshi; Higashinakagawa, Emiko; and Sato, Kanemitsu, 4,504,327, Cl. 148-31.550.
Kohno, Takeshi; Haruki, Kazuhito; and Nagase, Yasuo, 4,503,977, Cl. 209-564.000.
Kurosawa, Kei, 4,504,333, Cl. 148-187.000.
Moizumi, Ken'ichi, 4,503,686, Cl. 62-467.000.
Nakanishi, Masayuki; Tsuruzoe, Hirohisa; Sato, Humiyuki; and Hashimoto, Tokuo, 4,504,763, Cl. 313-318.000.
Noji, Takashi; Obata, Yoshiharu; and Higashi, Takayoshi, 4,504,738, Cl. 250-483.100.
Odawara, Kazuharu, 4,504,842, Cl. 346-137.000.
Okatsuka, Hisashi; Taniguchi, Koichi; Konno, Mitsuo; and Narita, Ryuho, 4,504,718, Cl. 219-10.55B.
Segawa, Makoto; and Ariizumi, Shoji, 4,504,746, Cl. 307-475.000.
Toyoda, Shinjiro, 4,504,926, Cl. 364-900.000.
Toldi, George; Nigam, Anil; and Crain, Ronald A., to SyQuest Technology. Disc drive arrangement. 4,504,879, Cl. 360-105.000.
Tomihashi, Nobuyuki: *See*—
Ohmori, Akira; and Tomihashi, Nobuyuki, 4,504,642, Cl. 526-246.000.
Tomita, Eihachiro: *See*—
Suzuki, Seiichi; and Tomita, Eihachiro, 4,504,773, Cl. 320-1.000.
Tomita, Koji: *See*—
Hanada, Minoru; Tsunakawa, Mitsuaki; Tomita, Koji; Tsukiura, Hiroshi; and Kawaguchi, Hiroshi, 4,504,580, Cl. 435-74.000.
Tomlinson, James E., to Anderson Strathclyde PLC. A.F.C. Drive gearbox. 4,503,731, Cl. 74-606.00R.
Tomy Kogyo Co., Inc.: *See*—
Kanno, Hideyuki, 4,504,056, Cl. 273-88.000.
Tomyn, Walter W., to Michigan Disposal, Inc. Apparatus for the treatment of waste sludge. 4,504,151, Cl. 366-156.000.
Toor, Yair: *See*—
George, Harvey F.; and Toor, Yair, 4,504,354, Cl. 156-639.000.
Torley, Jozsef: *See*—
Toth, Edit; Torley, Jozsef; Palosi, Eva; Szeberenyi, Szabolcs; Szporny, Laszlo; Gorog, Sandor; and Hajdu, Istvan, 4,504,481, Cl. 514-255.000.
Tornqvist, Nils-Erik: *See*—
Edebo, Lars B.; Swede, Harald G.; and Tornqvist, Nils-Erik, 4,503,873, Cl. 134-104.000.
Toshiba Kikai Kabushiki Kaisha: *See*—
Sunakawa, Kiyoshi; and Maruyama, Shinichi, 4,504,220, Cl. 432-72.000.
Toth, Edit; Torley, Jozsef; Palosi, Eva; Szeberenyi, Szabolcs; Szporny, Laszlo; Gorog, Sandor; and Hajdu, Istvan, to Richter Gedeon Vegyeszeti Gyar Rt. Benzhydrylpiperazine derivatives, process for their

preparation and pharmaceutical compositions containing them. 4,504,481, Cl. 514-255.000.

Towmotor Corporation: *See*—
Haffer, John J.; and Fredrick, Alan T., 4,503,935, Cl. 187-9.00E.
Rice, Bradley A., 4,503,936, Cl. 187-9.00R.

Toy, Wing N.: *See*—
Gallaher, Lee E.; Toy, Wing N.; and Zee, Benjamin, 4,504,902, Cl. 364-200.000.

Toyo Boseki Kabushiki Kaisha: *See*—
Kurita, Kazuo; and Ishihara, Hideaki, 4,504,545, Cl. 428-364.000.
Yasuda, Kazuo; Funabashi, Kyo; and Chiyoda, Akiyoshi, 4,504,541, Cl. 428-264.000.

Toyo Engineering Corporation: *See*—
Inoue, Shigeru; Ono, Hiroshi; Fukui, Akito; Fujii, Hidetsugu; Morikawa, Haruyuki; and Watanabe, Suguru, 4,504,679, Cl. 564-67.000.

Toyo Soda Manufacturing Co., Ltd.: *See*—
Sakamoto, Teruhisa; and Nakamura, Shigeo, 4,504,677, Cl. 562-534.000.

Toyo Tire & Rubber Company, Limited: *See*—
Otani, Kozo; Yamada, Yoshio; and Okumura, Hiroyuki, 4,504,648, Cl. 528-76.000.

Toyoda, Akira; and Chiba, Yasutsune, to Taisan Industrial Co., Ltd. Electromagnetic pump. 4,504,198, Cl. 417-417.000.

Toyoda, Kenji; Naito, Kaoru; and Yamamura, Norio, to Nippon Kogaku K.K. Method and apparatus for recording color images as color transfer superimposed laminations. 4,504,837, Cl. 346-1.100.

Toyoda Machine Works, Ltd.: *See*—
Yomogida, Toshihiko; Sakurai, Itaru; Yokota, Tsuyoshi; and Kato, Sadamu, 4,504,900, Cl. 364-140.000.

Toyoda, Nobuyuki: *See*—
Nii, Riro; Toyoda, Nobuyuki; and Hojo, Akimichi, 4,503,600, Cl. 29-571.000.

Toyoda, Shinjiro, to Tokyo Shibaura Denki Kabushiki Kaisha. Mode setting control system. 4,504,926, Cl. 364-900.000.

Toyota Jidosha Kabushiki Kaisha: *See*—
Ikemoto, Kazuhito; Terakura, Yukio; and Miyake, Takashi, 4,503,957, Cl. 192-4.00C.
Kobayashi, Nobuyuki; and Ito, Hiroshi, 4,503,822, Cl. 123-416.000.
Okumura, Takeshi; Nakanishi, Kiyoshi; Kanda, Mutsumi; Kotani, Takeshi; and Inoue, Tokuta, 4,503,819, Cl. 123-188.00M.
Saito, Taiji; Kato, Mitsuhisa; and Yasunaga, Kimioki, 4,503,679, Cl. 60-605.000.

Tracy, Terry G.: *See*—
Phillips, Kevin J.; and Tracy, Terry G., 4,504,032, Cl. 244-170.000.

Traut, Richard T.: *See*—
Fontaine, Gregory N.; and Traut, Richard T., 4,504,695, Cl. 174-21.00R.

Traver, Darwin G.; Anderson, Carl M.; and Abdelhamid, Amr N., to Carrier Corporation. Pressure variation absorber. 4,504,188, Cl. 415-1.000.

Trecan, Ltd.: *See*—
Turecek, Bozena, 4,503,784, Cl. 110-176.000.

Tregilgas, John H.: *See*—
Schaake, Herbert F.; Tregilgas, John H.; and Beck, Jeffrey D., 4,504,334, Cl. 148-191.000.

Trick, Gilbert: *See*—
Smith, Gilbert L.; Swanson, David L.; and Trick, Gilbert, 4,503,837, Cl. 126-190.000.

Trident Engineering Associates, Inc.: *See*—
Kapland, Mitchell A.; and Robinson, Melville W., Jr., 4,504,321, Cl. 106-117.000.

Trinh Dinh, Chan; and Bournonville, Jean-Paul, to Institut Francais du Petrole. Process for manufacturing supported bimetallic or plurimetallic catalysts comprising one or more metals from group VIII and at least one metal from group IV and the resultant catalysts thereof. 4,504,593, Cl. 502-154.000.

Trinks, Werner: *See*—
Vogel, Wolfgang; Trinks, Werner; and Heilmann, Horst, 4,503,688, Cl. 66-85.00A.

Triplett, Charles G. Vehicular mounted piezoelectric generator. 4,504,761, Cl. 310-800.000.

Trissler, Hans-Dieter: *See*—
Goller, Ernst; Kazmaier, Gunther; Trissler, Hans-Dieter; and Schmidt, Henning, 4,503,689, Cl. 66-149.00R.

Triumph-Adler A.G. fur Buro und Informationstechnik: *See*—
Bergermann, Franz; and Prufer, Michael, 4,504,825, Cl. 340-709.000.
Meinhardt, Heinrich; Berger, Alfons; and Zimmerman, Harald, 4,504,015, Cl. 241-3.000.

Trojnar, Jerzy A.: *See*—
Melin, Per O. R.; and Trojnar, Jerzy A., 4,504,469, Cl. 514-11.000.

Trost, David, to Perkin-Elmer Corporation, The. Simple electromechanical tilt and focus device. 4,504,144, Cl. 356-150.000.

Trzeciak, Arnold: *See*—
Felix, Arthur M.; Gillessen, Dieter; Studer, Rolf; Meienhofer, Johannes A.; and Trzeciak, Arnold, 4,504,415, Cl. 260-112.50R.

Tsai, Chung-Chieh: *See*—
DiSalvo, Anthony L.; and Tsai, Chung-Chieh, 4,504,633, Cl. 525-438.000.

Tshudy, James A.: *See*—
Miller, Jesse D., Jr.; Tshudy, James A.; and Unruh, Ralph E., 4,504,523, Cl. 427-197.000.

Tsuchida, Takayasu: *See*—
Kurahashi, Osamu; Tsuchida, Takayasu; Kawashima, Hiroki; Enei, Hitoshi; and Nakamori, Shigeru, 4,504,581, Cl. 435-107.000.

Tsuchiya, Tatsuhiko, to Alps Electric Co., Ltd. Auto-reverse type cassette tape player. 4,504,877, Cl. 360-96.200.

Tsuji, Teruji: *See*—
Yoshioka, Mitsuru; Shoichiro, Uyeo; Hamashima, Yoshio; Kikkawa, Ikuo; Tsuji, Teruji; and Nagata, Wataru, 4,504,659, Cl. 544-92.000.

Tsukaya, Takashi; and Takamatsu, Takeshi, deceased (by Takamatsu, Tokuyuki, legal representative), to Olympus Optical Co., Ltd. Endoscope system. 4,503,841, Cl. 128-4.000.

Tsukiura, Hiroshi: *See*—
Hanada, Minoru; Tsunakawa, Mitsuaki; Tomita, Koji; Tsukiura, Hiroshi; and Kawaguchi, Hiroshi, 4,504,580, Cl. 435-74.000.

Tsukui, Motoichi. Caster with a stopper. 4,503,943, Cl. 188-5.000.

Tsunakawa, Mitsuaki: *See*—
Hanada, Minoru; Tsunakawa, Mitsuaki; Tomita, Koji; Tsukiura, Hiroshi; and Kawaguchi, Hiroshi, 4,504,580, Cl. 435-74.000.

Tsunemi, Kazumasa; Suzuki, Taro; and Yamamoto, Yoshiichi, to Ube Industries, Ltd. Process for preparation of formaldehyde copolymers. 4,504,636, Cl. 526-67.000.

Tsunemi, Masaaki; and Sasaki, Umekichi, to Nippon Oil Co., Ltd. Refrigeration oil composition. 4,504,403, Cl. 252-68.000.

Tsuruzoe, Hirohisa: *See*—
Nakanishi, Masayuki; Tsuruzoe, Hirohisa; Sato, Humiyuki; and Hashimoto, Tokuo, 4,504,763, Cl. 313-318.000.

Tsutsumi, Hideo: *See*—
Takaya, Takao; Tsutsumi, Hideo; Yasuda, Nobuyuki; and Matsuda, Keiji, 4,504,472, Cl. 514-36.000.

Tsutsumi, Hisao; Inoue, Tomoko; and Ishida, Atsuo, to Kao Corporation. Emulsifying composition. 4,504,409, Cl. 252-351.000.

Tsutsumi, Hisao: *See*—
Takaishi, Naotake; Inamoto, Yoshiaki; Urata, Kouichi; Kawano, Junichi; and Tsutsumi, Hisao, 4,504,464, Cl. 424-63.000.

Tsuyoshi, Toshiaki: *See*—
Yonezawa, Seiji; Horikoshi, Tatsuo; and Tsuyoshi, Toshiaki, 4,504,937, Cl. 369-44.000.

Tsuzuki, Yoshihiko: *See*—
Nakamura, Tetsuya; Hobo, Nobuhito; Tsuzuki, Yoshihiko; Suzuki, Yutaka; Haseda, Satoshi; and Masuda, Akira, 4,503,830, Cl. 123-501.000.

Tucker, Trevor W.; and Conway, Larry J., to Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence of Her Majesty's Canadian Government. Sampling spectrum analyzer. 4,504,785, Cl. 324-77.00H.

Tucker, Trevor W.: *See*—
Conway, Larry J.; Tucker, Trevor W.; and Bouchard, Sylvain L., 4,504,791, Cl. 328-15.000.

Tuda, Mamoru: *See*—
Asai, Koichi; Oe, Kunio; and Tuda, Mamoru, 4,503,607, Cl. 29-832.000.

Tuftco Corporation: *See*—
Watkins, Charles W., 4,503,787, Cl. 112-79.00R.

Tummala, Rao R.; and Master, Raj N., to International Business Machines Corporation. Material and process set for fabrication of molecular matrix print head. 4,504,340, Cl. 156-89.000.

Turecek, Bozena, to Trecan, Ltd. Door closure assembly for incinerators, furnaces, and ovens. 4,503,784, Cl. 110-176.000.

Turner, Arthur R. Bracing element. 4,503,652, Cl. 52-657.000.

Turner Quick-Lift Corporation: *See*—
VanDenberg, Ervin K., 4,504,080, Cl. 280-704.000.

Turnock, Richard C.: *See*—
Carr, Edward H.; Knight, Harry W.; and Turnock, Richard C., 4,504,789, Cl. 324-418.000.

Tuss, John J., to Warner & Swasey Company, The. Coordinate measuring machine having vertical fine feed and lock mechanism. 4,503,614, Cl. 33-1.00M.

Ube Industries, Ltd.: *See*—
Matsui, Kanenobu; Uchiumi, Shinichiro; Iwayama, Akira; and Umezu, Takashi, 4,504,421, Cl. 260-465.600.
Matsui, Kanenobu; Uchiumi, Shinichiro; Iwayama, Akira; and Umezu, Takashi, 4,504,422, Cl. 260-465.600.
Tsunemi, Kazumasa; Suzuki, Taro; and Yamamoto, Yoshiichi, 4,504,636, Cl. 526-67.000.
Ueno, Haruo; Ashitaka, Hidetomo; Jinda, Kazuya; and Nakajima, Kouichi, 4,504,639, Cl. 526-146.000.

Uchida, Masaaki. System for collecting and conveying undersea mineral resources. 4,503,629, Cl. 37-57.000.

Uchida, Susumu; and Tadokoro, Kazushige, to Kabushiki Kaisha Sankosha. Arrester holder apparatus for distributor of communication apparatus. 4,504,883, Cl. 361-119.000.

Uchiumi, Shinichiro: *See*—
Matsui, Kanenobu; Uchiumi, Shinichiro; Iwayama, Akira; and Umezu, Takashi, 4,504,421, Cl. 260-465.600.
Matsui, Kanenobu; Uchiumi, Shinichiro; Iwayama, Akira; and Umezu, Takashi, 4,504,422, Cl. 260-465.600.

Uda, Yoshiaki; and Yashiki, Takatsuka, to Takeda Chemical Industries, Ltd. Pharmaceutical preparations containing TRH or its analogue. 4,504,470, Cl. 514-19.000.

Uehara, Hiroshi; and Shimizu, Tohru, to Kyowa Gas Chemical Industry Co., Ltd. Neodymium-containing transparent resin and method for manufacture thereof. 4,504,616, Cl. 524-398.000.

Ueno, Haruo; Ashitaka, Hidetomo; Jinda, Kazuya; and Nakajima, Kouichi, to Ube Industries, Ltd. Process for polymerizing 1,3-butadiene. 4,504,639, Cl. 526-146.000.

Ueno, Katumi: *See*—
Honda, Yasuhiro; Ueno, Katumi; Nishizaki, Genichi; Kitahara, Harumi; and Kamioka, Hiroshi, 4,503,606, Cl. 29-701.000.

Ueno, Susumu; and Kamata, Hideaki, to Shin-Etsu Chemical Co., Ltd. Method for imparting improved surface properties to a polymeric shaped article. 4,504,349, Cl. 156-272.600.
Uetsuki, Masao: *See—*
Murata, Yoshifumi; Igi, Keishiro; Narukawa, Hiroshi; Uetsuki, Masao; Bando, Satoshi; Kawai, Shuji; and Shirano, Kenji, 4,504,531, Cl. 428-35.000.
Ueyanagi, Kiichi; Takahashi, Susumu; Umemoto, Yasunari; and Nakamura, Michiharu, to Hitachi, Ltd. Method of fabricating field effect transistors. 4,503,599, Cl. 29-571.000.
Ufer, Peter P.: *See—*
Lindner, Horst J.; Ufer, Peter P.; Heck, Klaus; and Schmoger, Gerhard, 4,504,370, Cl. 204-129.100.
Ukai, Jun; Segawa, Hirohisa; and Ando, Haruki, to Mitsubishi Denki Kabushiki Kaisha. Arc welding robot control system. 4,504,728, Cl. 219-125.100.
Ulbert, Karel: *See—*
Sorm, Miloslav; Langpaul, Josef; Ulbert, Karel; Kadlec, Karel; Skalicky, Stanislav; Brazdil, Miroslav; Nespurek, Stanislav; Kensa, Jaromir; Zvonicek, Miroslav; and Hrdina, Zdenek, 4,503,996, Cl. 222-321.000.
Umemoto, Yasunari: *See—*
Ueyanagi, Kiichi; Takahashi, Susumu; Umemoto, Yasunari; and Nakamura, Michiharu, 4,503,599, Cl. 29-571.000.
Umezu, Takashi: *See—*
Matsui, Kanenobu; Uchiumi, Shinichiro; Iwayama, Akira; and Umezu, Takashi, 4,504,421, Cl. 260-465.600.
Matsui, Kanenobu; Uchiumi, Shinichiro; Iwayama, Akira; and Umezu, Takashi, 4,504,422, Cl. 260-465.600.
Umino, Kaoru: *See—*
Hara, Sadao; Moritani, Hiroaki; Kaga, Hisashi; Minaki, Toshihiro; Shibata, Kenichi; Ogawa, Junichi; and Umino, Kaoru, 4,504,527, Cl. 427-318.000.
Underberg, Emil E. J.; and Lembke, Andreas F., to Underberg-Handels AG. Process for improving the flavor and/or the mousseux of sparkling wines and sparkling wines produced according to said process. 4,504,496, Cl. 426-11.000.
Underberg-Handels AG.: *See—*
Underberg, Emil E. J.; and Lembke, Andreas F., 4,504,496, Cl. 426-11.000.
Underwood, Richard H.; and Todt, William H., to Westinghouse Electric Corp. Seismic restraint means for a nuclear radiation detector mounted in a tubular thimble. 4,504,437, Cl. 376-153.000.
Union Carbide Corporation: *See—*
Nicholson, Myron D., 4,504,501, Cl. 426-284.000.
Nicholson, Myron D., 4,504,507, Cl. 426-533.000.
Pines, Arthur N.; and Sabia, Angelo J., 4,504,549, Cl. 428-447.000.
Weber, Robert J., Jr.; and Smith, Donald F., Jr., 4,504,635, Cl. 525-450.000.
United States Gypsum Company: *See—*
Galer, Richard E., 4,504,335, Cl. 156-42.000.
O'Connell, Daniel D.; and Broz, Thomas A., 4,504,602, Cl. 521-78.000.
United States of America
Air Force: *See—*
Duncan, Garland H., III; and Cooper, David L., 4,503,668, Cl. 60-39.320.
Quinlan, Kenneth P.; and Erstfeld, Thomas E., 4,504,329, Cl. 148-175.000.
Army: *See—*
Campagnuolo, Carl H., 4,503,774, Cl. 102-207.000.
Ignacek, James F., 4,503,750, Cl. 89-34.000.
Commerce: *See—*
Kissam, Allan D., 4,504,498, Cl. 426-238.000.
Energy: *See—*
Cox, Samson A.; Bennett, Edgar F.; and Yule, Thomas J., 4,504,737, Cl. 250-435.000.
Cyrus, Jack D.; Kadlec, Emil G.; and Klimas, Paul C., 4,504,192, Cl. 416-41.000.
Lauritzen, Ted, 4,504,023, Cl. 242-54.00R.
Spurrier, Francis R.; DeZubay, Egon A.; Murray, Alexander P.; and Vidt, Edward J., 4,504,447, Cl. 422-204.000.
Stevens, Charles G., 4,504,953, Cl. 372-56.000.
Navy: *See—*
Bond, Gary M.; and Marshall, Albert H., 4,504,232, Cl. 434-11.000.
Howard, Dean D.; and Cross, David C., 4,504,835, Cl. 343-755.000.
Lippitt, Maxwell W., Jr.; and Nuckols, Marshall L., 4,503,565, Cl. 2-2.10R.
Patch, Stanley J., 4,504,230, Cl. 433-219.000.
U.S. Philips Corporation: *See—*
Davies, Neil A.; and Hughes, Edward T. E., 4,504,849, Cl. 357-67.000.
Faber, Johannes W.; and deVos, Jacobus A., 4,504,936, Cl. 369-34.000.
Harwig, Hendrik A.; Slotboom, Jan W.; and Pelgrom, Marcellinus J. M., 4,504,930, Cl. 365-238.000.
Hunzinger, Jean J., 4,504,111, Cl. 350-96.200.
Jansen, Gerardus L. M., 4,504,935, Cl. 369-32.000.
Meyer, Joseph; and Vinton, David J., 4,504,574, Cl. 430-331.000.
Rademaker, Gerrit, 4,504,974, Cl. 455-601.000.
Roberts, Charles C.; and Wright, Jeffrey R., 4,504,814, Cl. 337-112.000.
Schofield, John, 4,504,759, Cl. 310-313.00C.
Thordarson, Gunnar G., 4,503,775, Cl. 102-214.000.
United States Steel Corporation: *See—*
Roeder, Gerald M., 4,503,696, Cl. 72-197.000.
United Technologies Corporation: *See—*
Kniat, John; Kuhlberg, Joel F.; and Mickey, Daniel A., 4,504,030, Cl. 244-57.000.
Universal Dispensing Systems, Inc.: *See—*
Martin, Douglas S., 4,503,998, Cl. 222-341.000.
Universal Electric Company: *See—*
Stone, Thomas W., 4,504,754, Cl. 310-90.000.
University of Southern California by G. June Marshall: *See—*
Marshall, G. June; and Snyder, Stephen J., 4,504,493, Cl. 514-738.000.
Unruh, Ralph E.: *See—*
Miller, Jesse D., Jr.; Tshudy, James A.; and Unruh, Ralph E., 4,504,523, Cl. 427-197.000.
UOP Inc.: *See—*
Forbes, James T., 4,504,450, Cl. 423-239.000.
Upright, Inc.: *See—*
Smith, Daniel G., 4,504,074, Cl. 280-93.000.
Urakawa, Hidetaka; and Aoki, Toshiyuki, to Komori Printing Machine Co., Ltd. Gripper pad height adjusting device for sheet-fed rotary printing presses. 4,503,772, Cl. 101-409.000.
Urata, Kouichi: *See—*
Takaishi, Naotake; Inamoto, Yoshiaki; Urata, Kouichi; Kawano, Junichi; and Tsutsumi, Hisao, 4,504,464, Cl. 424-63.000.
Urban Transportation Development Corporation Ltd.: *See—*
Chadwick, Dennis P., 4,503,779, Cl. 105-4.00R.
Urbanietz, Josef: *See—*
Rosner, Manfred; Urbanietz, Josef; Loewe, Heinz; Duwel, Dieter; and Kirsch, Reinhard, 4,504,490, Cl. 514-483.000.
Ury, Michael G.; Wood, Charles H.; and Ryan, Patrick J., to Fusion Systems Corporation. Electrodeless lamp using a single magnetron and improved lamp envelope therefor. 4,504,768, Cl. 315-248.000.
Ushio Denki Kabushiki Kaisha: *See—*
Arai, Tetsuji; and Ikeuchi, Mitsuru, 4,504,323, Cl. 148-1.500.
Shimizu, Hiroshi, 4,504,730, Cl. 219-411.000.
Ushiroda, Mitsuhiro: *See—*
Tanaka, Hideaki; Fujita, Kunihiro; and Ushiroda, Mitsuhiro, 4,504,258, Cl. 474-263.000.
Ushirokajitani, Yoshiyuki: *See—*
Fujishita, Kazuo; Kaneko, Hideki; Ushirokajitani, Yoshiyuki; and Kanno, Tadao, 4,503,810, Cl. 122-13.00R.
Usui, Minoru, to Casio Computer Co., Ltd. Electronic equipment. 4,504,829, Cl. 340-756.000.
Utagawa, Ikuo: *See—*
Kubo, Yoshizo; and Utagawa, Ikuo, 4,504,700, Cl. 178-18.000.
Uyeda, Tim M.: *See—*
Payne, Errol G.; McGregor, Charles D.; and Uyeda, Tim M., 4,504,160, Cl. 400-196.100.
Vacuumschmelze GmbH: *See—*
Hillmann, Hans, 4,503,602, Cl. 29-599.000.
Valignat, Jean: *See—*
Aubert, Andre ; Valignat, Jean; and Wyon, Christophe, 4,504,553, Cl. 428-622.000.
ValleyLab, Inc.: *See—*
Steuer, Robert R.; and Harris, David H., 4,504,263, Cl. 604-65.000.
van Arragon, Gerrit W.: *See—*
Boute, Willem; Wittkampf, Frederik H. M.; van Arragon, Gerrit W.; and Mensink, Kornelis A., 4,503,857, Cl. 128-419.0PG.
van de Laarschot, Franciscus A. A. E.: *See—*
Koeleman, Gerardus A. J.; and van de Laarschot, Franciscus A. A. E., 4,503,960, Cl. 192-127.000.
van de Leemput, Lambertus J. M. A.; Nooijen, Godefridus A. H.; and van der Loo, Hendrikus W., to Stamicarbon, B.V. Polymerization catalyst for the preparation of ethylene polymer. 4,504,592, Cl. 502-104.000.
VanDenberg, Ervin K., to Turner Quick-Lift Corporation. Leaf spring lift axle suspension system. 4,504,080, Cl. 280-704.000.
Van Den Berghe, James A.: *See—*
Petty, Dale H.; Penner, David A.; and Van Den Berghe, James A., 4,503,859, Cl. 128-635.000.
van den Bosch, Pierre A.: *See—*
Bond, Alan M.; Hudson, Henry A.; van den Bosch, Pierre A.; and Walter, Frederick L., 4,504,367, Cl. 204-1.00T.
van der Loo, Hendrikus W.: *See—*
van de Leemput, Lambertus J. M. A.; Nooijen, Godefridus A. H.; and van der Loo, Hendrikus W., 4,504,592, Cl. 502-104.000.
Vandewege, Derron G.: *See—*
Nordquist, Dennis D.; and Vandewege, Derron G., 4,503,755, Cl. 98-110.000.
Van Duzee, Barry F.; and Degenhardt, Charles R., to Mallinckrodt, Inc. Process for making a lyophilized product for use in skeletal imaging. 4,504,462, Cl. 424-1.100.
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Watkins, Nathan L., Sr. Sow-operated feed stall. 4,503,809, Cl. 119-27.000.
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Whiteford, Carl. Combination square, scribing tool and plumb level. 4,503,624, Cl. 33-451.000.
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Wikdahl, Nils A. L. Process for cleaning chemical cellulose pulp by screening and apparatus. 4,504,016, Cl. 241-24.000.
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Hsia, Chung-hweng; Owen, Hartley; and Wright, Bernard S., 4,504,691, Cl. 585-519.000.
Tabak, Samuel A.; Wright, Bernard S.; and Owen, Hartley, 4,504,693, Cl. 585-520.000.
Wright, Franklin J.; Richard, Michael A.; and Pirkle, James C., to Exxon Research and Engineering Co. Process for producing alcohols using iron-thallium catalysts. 4,504,600, Cl. 518-717.000.
Wright, James H.: *See*—
Mead, Theodore C.; and Wright, James H., 4,504,376, Cl. 208-25.000.
Wright, Jeffrey R.: *See*—
Roberts, Charles C.; and Wright, Jeffrey R., 4,504,814, Cl. 337-112.000.
Wright, Wade S.: *See*—
McClelland, John R.; Wright, Wade S.; Diamond, Edward P.; Pryor, Leroy C.; and Olson, Douglas R., 4,504,957, Cl. 373-130.000.
Wuensch, Hartmut. Molten metal sampler. 4,503,716, Cl. 73-864.570.
Wycliffe, Henryk, to BOC Group plc, The. Mechanical pumps. 4,504,201, Cl. 418-3.000.
Wyon, Christophe: *See*—
Aubert, Andre ; Valignat, Jean; and Wyon, Christophe, 4,504,553, Cl. 428-622.000.
Xadar Corporation: *See*—
Fowler, James C.; Wheatley, Howard S.; and Davis, John L., 4,504,833, Cl. 343-5.0NA.
Xerox Corporation: *See*—
Pai, Damodar M.; Pochan, Darlyn F.; and Pochan, John M., 4,504,564, Cl. 430-132.000.
Xomox Corporation: *See*—
Gardner, John F.; and Showalter, Thomas W., 4,503,675, Cl. 60-527.000.
Yacono, Charles: *See*—
Atlani, Martial; Loutaty, Roben; Wakselman, Claude; and Yacono, Charles, 4,504,287, Cl. 55-53.000.
Yagyu, Takashi; Yamaguchi, Takeshi; Tanaka, Sotaro; and Sakaki, Yasuo, to Hitachi Construction Machinery Co., Inc. Hydraulic circuit of hydraulic power shovel. 4,504,185, Cl. 414-700.000.
Yakusheva, Galina G.: *See*—
Motov, David L.; Tjurkina, Ljudmila P.; Godneva, Maria M.; Kolesnikova, Nina I.; Yakusheva, Galina G.; Ivanovich, Metelkin A., deceased; and Fedorovna, Chibisova N., administrator, 4,504,271, Cl. 8-94.250.
Yamada, Kazuo; and Sakaki, Hiroshi, to Ryowa Engineering Company, Limited. Soldering device for radiator tanks. 4,504,223, Cl. 432-225.000.
Yamada, Kiichiro: *See*—
Onodera, Hiromi; Wakabayashi, Noriaki; Yamada, Kiichiro; and Sugizaki, Yasushi, 4,504,750, Cl. 310-12.000.
Yamada, Masato: *See*—
Tokunaga, Yoshikuni; and Yamada, Masato, 4,504,326, Cl. 148-12.00C.
Yamada, Yasuhiro, to Victor Company of Japan, Ltd. Data reading apparatus for data transmission. 4,504,960, Cl. 375-94.000.
Yamada, Yoshio: *See*—
Otani, Kozo; Yamada, Yoshio; and Okumura, Hiroyuki, 4,504,648, Cl. 528-76.000.
Yamada, Yukihiko: *See*—
Ishii, Nobuyoshi; and Yamada, Yukihiko, 4,504,180, Cl. 411-5.000.
Yamaguchi, Takeshi: *See*—
Yagyu, Takashi; Yamaguchi, Takeshi; Tanaka, Sotaro; and Sakaki, Yasuo, 4,504,185, Cl. 414-700.000.
Yamaguchi, Toru: *See*—
Kuwabara, Hideki; Yoshimura, Shohei; Yamaguchi, Toru; and Sudo, Yoshimi, 4,504,601, Cl. 521-58.000.
Kuwabara, Hideki; Yoshimura, Shohei; Yamaguchi, Toru; and Sudo, Yoshimi, 4,504,653, Cl. 528-491.000.
Yamaguchi, Toyohiko; Kashima, Koichi; Ozutsumi, Minoru; and Morinaga, Masaru, to Hodogaya Chemical Co., Ltd.; and Katsura Sangyo Co., Ltd. Sulfur-containing polyester and process for its production. 4,504,651, Cl. 528-360.000.
Yamakoshi, Noby. System for making matched backgrounds. 4,504,141, Cl. 355-77.000.
Yamamoto, Hiroshi; Katsuma, Makoto; Murakami, Hiroyasu; and Hiramatsu, Akira, to Canon Kabushiki Kaisha. Piezoelectrically driven vibration wave motor. 4,504,760, Cl. 310-323.000.
Yamamoto, Takeshi; and Goto, Kiyoshi, to Konishiroku Photo Industry Co., Ltd. Light-sensitive lithographic printing plate. 4,504,567, Cl. 430-165.000.
Yamamoto, Tomoyuki: *See*—
Shikama, Takashi; Yamamoto, Tomoyuki; and Takaoka, Yuichi, 4,504,817, Cl. 338-23.000.
Yamamoto, Toshitaka: *See*—
Kushima, Tadao; Gooda, Masahiro; Soga, Tasao; and Yamamoto, Toshitaka, 4,503,597, Cl. 29-569.00R.
Yamamoto, Yoshiichi: *See*—
Tsunemi, Kazumasa; Suzuki, Taro; and Yamamoto, Yoshiichi, 4,504,636, Cl. 526-67.000.
Yamamura, Michael M.: *See*—
Spence, John R.; and Yamamura, Michael M., 4,504,745, Cl. 307-473.000.
Yamamura, Norio: *See*—
Toyoda, Kenji; Naito, Kaoru; and Yamamura, Norio, 4,504,837, Cl. 346-1.100.
Yamamura, Yutaka; Kaneko, Tomomichi; and Hayashi, Shunichi, to Nitto Electric Industrial Co., Ltd. Method of peel development. 4,504,571, Cl. 430-253.000.
Yamaoka, Hideyuki; Hatano, Michiharu; Miyazaki, Tomio; Shimoda, Teruhisa; and Oki, Koji, to Sumitomo Metal Industries, Ltd. Apparatus for coal-gasification and making pig iron. 4,504,043, Cl. 266-160.000.
Yamashita, Fumitoshi; and Sakano, Tomiaki, to Matsushita Electric Industrial Co., Ltd. Friction material. 4,504,543, Cl. 428-338.000.
Yamashita, Takeshi: *See*—
Watanabe, Yuji; and Yamashita, Takeshi, 4,504,706, Cl. 200-11.00R.
Yamato Mishin Seizo Kabushi Kaisha: *See*—
Ishihara, Keiichi; and Matsumoto, Fumio, 4,503,794, Cl. 112-313.000.
Yamauchi, Takahiko: *See*—
Aoyama, Keizo; and Yamauchi, Takahiko, 4,504,743, Cl. 307-310.000.
Yamazaki, Etsuo: *See*—
Matsuura, Hitoshi; Yamazaki, Etsuo; and Sakurai, Hiroshi, 4,504,772, Cl. 318-603.000.
Yamazaki, Kazuhiro; and Miwa, Takamichi, to Daicel Chemical Industries, Ltd. Concentrator system. 4,504,355, Cl. 159-3.000.
Yan, Tsoung Y.: *See*—
Shu, Paul; and Yan, Tsoung Y., 4,504,377, Cl. 208-75.000.
Yant, Robert E.; and Galluch, Richard J., to Quantum Technologies, Inc. Process and apparatus for the manufacture of hyprochlorous acid. 4,504,456, Cl. 423-473.000.
Yashiki, Takatsuka: *See*—
Uda, Yoshiaki; and Yashiki, Takatsuka, 4,504,470, Cl. 514-19.000.
Yasuda, Kazuo; Funabashi, Kyo; and Chiyoda, Akiyoshi, to Toyo Boseki Kabushiki Kaisha. Antimicrobial fabrics having improved susceptibility to discoloration and process for production thereof. 4,504,541, Cl. 428-264.000.
Yasuda, Nobuyuki: *See*—
Takaya, Takao; Tsutsumi, Hideo; Yasuda, Nobuyuki; and Matsuda, Keiji, 4,504,472, Cl. 514-36.000.
Yasui, Yoshiharu: *See*—
Horiuchi, Mitsunori; Suzuki, Yoshihisa; Yasui, Yoshiharu; and Seiki, Kazuo, 4,503,662, Cl. 57-261.000.
Yasunaga, Kimioki: *See*—
Saito, Taiji; Kato, Mitsuhisa; and Yasunaga, Kimioki, 4,503,679, Cl. 60-605.000.

Yax, Michael J., to Textron, Inc. Method for edge grinding multifaceted lenses. 4,503,613, Cl. 51-284.00E.

Yeager, Raymond W.; and Marzocchi, Alfred, to Owens-Corning Fiberglas Corporation. Insulation system for inner side of exterior wall. 4,503,655, Cl. 52-747.000.

Yokono, Hitoshi: *See*—
Nate, Kazuo; Inoue, Takashi; and Yokono, Hitoshi, 4,504,646, Cl. 528-16.000.

Yokota, Minoru; Murakami, Kazuhito; and Takahashi, Kenichi, to Sumitomo Electric Industries, Ltd. Process for producing infrared light transmitting optical fiber. 4,504,298, Cl. 65-3.110.

Yokota, Tsuyoshi: *See*—
Yomogida, Toshihiko; Sakurai, Itaru; Yokota, Tsuyoshi; and Kato, Sadamu, 4,504,900, Cl. 364-140.000.

Yokoyama, Kenji, to Nippon Gakki Seizo Kabushiki Kaisha. Pulse-width modulation circuit. 4,504,793, Cl. 330-10.000.

Yomogida, Toshihiko; Sakurai, Itaru; Yokota, Tsuyoshi; and Kato, Sadamu, to Toyoda Machine Works, Ltd. Sequence instruction display system. 4,504,900, Cl. 364-140.000.

Yonezawa, Keitaro; and Sirakawa, Tsutomu. Retracting clamp. 4,504,046, Cl. 269-24.000.

Yonezawa, Seiji; Horikoshi, Tatsuo; and Tsuyoshi, Toshiaki, to Hitachi, Ltd. Optical information tracking apparatus. 4,504,937, Cl. 369-44.000.

Yoshida, Eiichi: *See*—
Nozaki, Hiromi; and Yoshida, Eiichi, 4,504,139, Cl. 355-14.00R.

Yoshida, Kazuya: *See*—
Hasegawa, Mineo; Yoshida, Kazuya; Miyauchi, Sakae; and Terazono, Masami, 4,504,583, Cl. 435-206.000.

Yoshida, Kenji, to Takeda Riken Co., Ltd. Delay pulse generating circuit. 4,504,749, Cl. 307-590.000.

Yoshida, Takehiko: *See*—
Yoshioka, Takatoshi; Kirihara, Seishin; Siga, Masao; Yoshida, Takehiko; Hisano, Katsukuni; Tan, Toshimi; and Kobayashi, Masahiro, 4,504,554, Cl. 428-683.000.

Yoshida, Yoshinobu; Sakai, Nobuo; and Ishikawa, Takatoshi, to Fuji Photo Film Co., Ltd. Silver halide photographic materials. 4,504,577, Cl. 430-564.000.

Yoshii, Osamu. Orthodontic treating device and method of manufacturing same. 4,504,225, Cl. 433-6.000.

Yoshikawa, Isao; Tanimizu, Tooru; and Sugitani, Sinzi, to Hitachi, Ltd. Switch board. 4,504,885, Cl. 361-342.000.

Yoshikawa, Masao; Kan, Fumitaka; and Satomura, Hiroshi, to Canon Kabushiki Kaisha. Magnetic developing device with offset magnetic pole. 4,504,136, Cl. 355-3.0DD.

Yoshikumi, Chikao; Fujii, Takayoshi; Saito, Kenichi; Fujii, Masahiko; and Niimura, Koichi, to Kureha Kagaku Kogyo Kabushiki Kaisha. Platinum compound and drug. 4,504,487, Cl. 514-492.000.

Yoshimura, Shohei: *See*—
Kuwabara, Hideki; Yoshimura, Shohei; Yamaguchi, Toru; and Sudo, Yoshimi, 4,504,601, Cl. 521-58.000.
Kuwabara, Hideki; Yoshimura, Shohei; Yamaguchi, Toru; and Sudo, Yoshimi, 4,504,653, Cl. 528-491.000.

Yoshinari, Yukihiro: *See*—
Kuroki, Yoichi; Yoshinari, Yukihiro; and Hiraga, Ryozo, 4,504,148, Cl. 356-401.000.

Yoshioka, Hayao: *See*—
Arakawa, Masatoshi; Yoshioka, Hayao; and Nakazawa, Kazuyoshi, 4,504,692, Cl. 585-633.000.

Yoshioka, Mitsuru; Shoichiro, Uyeo; Hamashima, Yoshio; Kikkawa, Ikuo; Tsuji, Teruji; and Nagata, Wataru, to Shionogi & Co., Ltd. 1-Oxadethiacepham compounds. 4,504,659, Cl. 544-92.000.

Yoshioka, Takatoshi; Kirihara, Seishin; Siga, Masao; Yoshida, Takehiko; Hisano, Katsukuni; Tan, Toshimi; and Kobayashi, Masahiro, to Hitachi, Ltd. Rotor shaft of steam turbine. 4,504,554, Cl. 428-683.000.

Young, Dan B.: *See*—
Dyson, Lewis R.; Young, Dan B.; and Cook, Stuart A., 4,504,241, Cl. 446-304.000.

Young, Russell. Semi-jacketed bullet having integral jacket retaining means, and method of making. 4,503,777, Cl. 102-514.000.

Yui, Hiroshi; Sobajima, Yoshihiro; Higashide, Osamu; Imamura, Tsuyoshi; Okamura, Michiya; and Hattori, Satoru, to Mitsubishi Petrochemical Co., Ltd. Inorganic filler containing propylene polymer compositions. 4,504,617, Cl. 524-426.000.

Yule, Thomas J.: *See*—
Cox, Samson A.; Bennett, Edgar F.; and Yule, Thomas J., 4,504,737, Cl. 250-435.000.

Yunick, Henry, to MotorTech, Inc. Apparatus and operating method for an internal combustion engine. 4,503,833, Cl. 123-545.000.

Yurita, Yoshihiro: *See*—
Suzuki, Takeo; Matsumoto, Itsuro; Yurita, Yoshihiro; and Zenpo, Hideharu, 4,503,722, Cl. 74-96.000.

Zabel, Lutz D.; Widmer, Jurg; and Sulser, Ueli. Compounds having one or more aldimine and oxazolidine groups, process for their preparation and their use as curing agents for polyisocyanates. 4,504,647, Cl. 528-68.000.

Zaidan Hojin Handotai Kenkyu Shinkokai: *See*—
Nishizawa, Jun-ichi, 4,504,847, Cl. 357-22.000.

Zajicek, Ernst: *See*—
Lugscheider, Walter; Steipe, Othmar; Riegler, Ernst; and Zajicek, Ernst, 4,504,307, Cl. 75-10.00R.

Zander, Richard A.: *See*—
Crumb, Donald A.; and Zander, Richard A., 4,503,677, Cl. 60-562.000.

Zandonatti, Raymond A.: *See*—
Lueker, Jonathan C.; and Zandonatti, Raymond A., 4,504,809, Cl. 335-208.000.

Zanker, Fritz: *See*—
Goetz, Norbert; Girgensohn, Bjoern; and Zanker, Fritz, 4,504,363, Cl. 203-14.000.

Zasio, John; Elvey, Dwight; and Tanizawa, Ronald, to STORAGE Technology Partners. Test fixture for providing electrical access to each I/O pin of a VLSI chip having a large number of I/O pins. 4,504,783, Cl. 324-73.00R.

Zbinden, Terry B., to Sperry Corporation. Detection of catastrophic failure of dielectric, improper connection, and temperature of a printed circuit assembly via one wire. 4,504,782, Cl. 324-73.0PC.

Zbinden, Terry B.: *See*—
Currie, Thomas P.; and Zbinden, Terry B., 4,504,156, Cl. 374-45.000.

Zee, Benjamin: *See*—
Gallaher, Lee E.; Toy, Wing N.; and Zee, Benjamin, 4,504,902, Cl. 364-200.000.

Zelez, Joseph, to RCA Corporation. Diamond-like film and process for producing same. 4,504,519, Cl. 427-39.000.

Zeller, Hans: *See*—
Bube, Carsten; Thiele, Gerd; and Zeller, Hans, 4,504,732, Cl. 219-497.000.

Zellweger, Shea. Devices for displaying or performing operations in a two-valued system. 4,504,236, Cl. 434-433.000.

Zenpo, Hideharu: *See*—
Suzuki, Takeo; Matsumoto, Itsuro; Yurita, Yoshihiro; and Zenpo, Hideharu, 4,503,722, Cl. 74-96.000.

Ziegler, Jeffry A.: *See*—
Passarell, Wayne H.; and Ziegler, Jeffry A., 4,504,036, Cl. 248-632.000.

Zimmerman, Harald: *See*—
Meinhardt, Heinrich; Berger, Alfons; and Zimmerman, Harald, 4,504,015, Cl. 241-3.000.

Zimmermann, Jean-Pierre: *See*—
Bichara, Michel; Koensgen, Jean-Pierre; Bodu, Michel; Meriaux, Michel; and Zimmermann, Jean-Pierre, 4,504,092, Cl. 299-5.000.

Zingrini, Carlo; and Oreglio, Maurizio, to Telettra-Telefonia Elettronica E Radio S.p.A. Pitch variators for sub-rack connectors. 4,504,107, Cl. 339-125.00R.

Zion, Earl M., to Owens-Corning Fiberglas Corporation. Hollow rod and method of making and using. 4,504,175, Cl. 405-260.000.

Zolik, Thomas C. Heat exchanger for recovering waste heat. 4,503,902, Cl. 165-47.000.

Zollman, Richard: *See*—
Tessler, Moshe; Silberman, Chaim; and Zollman, Richard, 4,503,687, Cl. 63-28.000.

Zoor, Reinhold, to Heinrich Wunder GmbH KG. Ski binding with biasing means. 4,504,078, Cl. 280-615.000.

Zucker, Jerry; Singletary, Michael P.; and Fabian, James L., to RM Industrial Products Company, Inc. Process for coating aqueous fluoropolymer coating on porous substrate. 4,504,528, Cl. 427-389.800.

Zuckler, Karl, to Siemens Aktiengesellschaft. Vacuum switching tube having magnetic field electrodes. 4,504,711, Cl. 200-144.00B.

Zulfilar, Farida Y. Art lighting system with stepwise creation and display of workpiece. 4,504,892, Cl. 362-234.000.

Zurn Industries, Inc.: *See*—
Winschel, Richard E., deceased; Heil, Fred B.; and Seibel, Robert V., 4,504,217, Cl. 431-183.000.

Zvonicek, Miroslav: *See*—
Sorm, Miloslav; Langpaul, Josef; Ulbert, Karel; Kadlec, Karel; Skalicky, Stanislav; Brazdil, Miroslav; Nespurek, Stanislav; Kensa, Jaromir; Zvonicek, Miroslav; and Hrdina, Zdenek, 4,503,996, Cl. 222-321.000.

ZVS Vyzkumnevyvojovy ustav koncernova ucelova organizace: *See*—
Novak, Jiri; Pjgrt, Jan; Bezdicek, Jan; Fenik, Milan; Kuda, Vladimir; and Vasicek, Vladimir, 4,503,891, Cl. 139-116.000.

Zwiercan , Gary A.: *See*—
Bell, Harvey; Lenchin, Julianne M.; and Zwiercan , Gary A., 4,504,509, Cl. 426-549.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 12TH DAY OF MARCH, 1985

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Brugner, Frank S., Jr., to Square D Company. Silver, cadmium oxide, lithium carbonate contact material and method of making the material. Re. 31,846, Cl. 75-232.000.

Eastman Kodak Company: *See*—
Luckey, George W., Re. 31,847, Cl. 250-327.200.

Joy Manufacturing Company: *See*—
Peters, Clifford M., Re. 31,845, Cl. 137-557.000.

Luckey, George W., to Eastman Kodak Company. Apparatus and method for producing images corresponding to patterns of high energy radiation. Re. 31,847, Cl. 250-327.200.

Nilssen, Ole K. Electronic assembly. Re. 31,848, Cl. 315-360.000.

Peters, Clifford M., to Joy Manufacturing Company. Relay valve for fluid actuators. Re. 31,845, Cl. 137-557.000.

Square D Company: *See*—
Brugner, Frank S., Jr., Re. 31,846, Cl. 75-232.000.

LIST OF DESIGN PATENTEES

AGA Aktiebolag: *See*—
Lang, Svante, 277,977, Cl. D23-2.000.

Ahlberg Beckrot Ytter AB: *See*—
Beckrot, Anders, 277,934, Cl. D8-395.000.
Beckrot, Anders, 277,935, Cl. D8-382.000.

AMCO Corporation: *See*—
Bentson, Wade A., 277,922, Cl. D7-43.000.

American Commercial, Incorporated: *See*—
Laslo, Larry R., 277,919, Cl. D7-5.000.
Laslo, Larry R., 277,920, Cl. D7-5.000.

Andrus, Julia, to Authentica, Inc. Christmas ornament. 277,944, 3-12-85, Cl. D11-121.000.

Aronowitz, Robert; and Katzanek, Bernard, to Simmons Universal Corporation. Arm rest. 277,916, 3-12-85, Cl. D6-501.000.

AT&T Technologies, Inc.: *See*—
Cooke, Kenneth R.; and Porcelli, Vito L., 277,958, Cl. D14-60.000.

Authentica, Inc.: *See*—
Andrus, Julia, 277,944, Cl. D11-121.000.

B.M.X. Products, Inc.: *See*—
Hess, Stanley C., 277,953, Cl. D12-208.000.

Baptiste, Michael. Angle-cut holder. 277,932, 3-12-85, Cl. D8-71.000.

Barber, James W. Cassette tape holder. 277,905, 3-12-85, Cl. D6-407.000.

Becker, James H., to Marketing International, Inc. Cart for handling biological tissue. 277,991, 3-12-85, Cl. D34-20.000.

Beckman Instruments, Inc.: *See*—
Brown, Hugh O.; and Lindsay, James R., 277,979, Cl. D24-1.100.

Beckrot, Anders, to Ahlberg Beckrot Ytter AB. Snap fastener for foldable display panels. 277,934, 3-12-85, Cl. D8-395.000.

Beckrot, Anders, to Ahlberg Beckrot Ytter AB. Wedging fastener for foldable display panels. 277,935, 3-12-85, Cl. D8-382.000.

Bentson, Wade A., to AMCO Corporation. Tortilla basket fryer. 277,922, 3-12-85, Cl. D7-43.000.

Bergstedt, Lowell C.; and Bergstedt, Marie C. Child's growth measuring and registering unit. 277,939, 3-12-85, Cl. D10-71.000.

Bergstedt, Lowell C.; and Bergstedt, Marie C. Child's growth measuring and registering unit. 277,940, 3-12-85, Cl. D10-71.000.

Bergstedt, Marie C.: *See*—
Bergstedt, Lowell C.; and Bergstedt, Marie C., 277,939, Cl. D10-71.000.
Bergstedt, Lowell C.; and Bergstedt, Marie C., 277,940, Cl. D10-71.000.

Berns, Peter M.; and Simonoff, Ely, to Opelika Manufacturing Corporation. Towel for pets. 277,918, 3-12-85, Cl. D6-608.000.

Blackburn, Chester A. Device for removing a cap from a jar. 277,925, 3-12-85, Cl. D8-37.000.

Blumenthal, Martin. Tricycle. 277,947, 3-12-85, Cl. D12-112.000.

Boeing Company, The: *See*—
Holloway, Richard B.; and Millett, Merlin L., Jr., 277,976, Cl. D22-11.000.

Bousman, William J., to Western Publishing Co. Housing for voice synthesizer and voice activating bar code reader. 277,963, 3-12-85, Cl. D14-107.000.

Brandsma, Sies K., to U.S. Philips Corporation. Clock radio receiver. 277,960, 3-12-85, Cl. D14-73.000.

Bransky, Olaf, to Siemens Aktiengesellschaft. Medication dosaging device or similar article. 277,980, 3-12-85, Cl. D24-8.000.

Brown, Hugh O.; and Lindsay, James R., to Beckman Instruments, Inc. Amino acid analyzer. 277,979, 3-12-85, Cl. D24-1.100.

Bundschuh, Robert L. Trigger sprayer. 277,978, 3-12-85, Cl. D23-17.000.

Bungerfeldt, Stefan: *See*—
Dalgren, Tomas; and Bungerfeldt, Stefan, 277,941, Cl. D10-83.000.

Burch, Mark E.: *See*—
Hurley, Kenneth D., 277,948, Cl. D12-126.000.

Burlington Furniture, Div. of Burlington Industries, Inc.: *See*—
West, Haywood L., 277,909, Cl. D6-507.000.

Bustos, Jose N. S. Desk organizer with utility compartments. 277,969, 3-12-85, Cl. D19-75.000.

Camino Laboratories: *See*—
Knute, Wallace L., 277,938, Cl. D10-60.000.

Campbell Soup Company: *See*—
Terwilliger, Frank H., 277,965, Cl. D15-90.000.

Chas. "Robby" Robinson Enterprises, Inc.: *See*—
Starzec, Edward M., 277,903, Cl. D3-36.000.

Chow, Ivan. Can opener. 277,926, 3-12-85, Cl. D8-41.000.

Cooke, Kenneth R.; and Porcelli, Vito L., to AT&T Technologies, Inc. Telephone instrument base for a handset. 277,958, 3-12-85, Cl. D14-60.000.

Cosden Technology, Inc.: *See*—
Fortuna, Vincent E., 277,937, Cl. D9-447.000.

Cromemco Inc.: *See*—
Xanthopoulus, Eric G., 277,964, Cl. D14-109.000.

Croydon, Frederic G., to Omark Industries, Inc. Circular saw blade or the like. 277,930, 3-12-85, Cl. D8-70.000.

Croydon, Frederic G., to Omark Industries, Inc. Circular saw blade. 277,931, 3-12-85, Cl. D8-70.000.

Dalgren, Tomas; and Bungerfeldt, Stefan, to NAF Aktiebolag. Measure beam for measuring force and/or movement. 277,941, 3-12-85, Cl. D10-83.000.

DeGregorio, Anthony, to Preferred Services, Ltd. Water toy. 277,971, 3-12-85, Cl. D21-59.000.

Delgado, Pablo V.; and Maresca, Diane K., to Maresca, Neal. Hot tub. 277,984, 3-12-85, Cl. D24-38.000.

Eldon Industries, Inc.: *See*—
Evenson, Mel, 277,912, Cl. D19-34.100.

Evenson, Mel, to Eldon Industries, Inc. Bookend. 277,912, 3-12-85, Cl. D19-34.100.

Executive Office Concepts: *See*—
Liisberg, Henrik, 277,908, Cl. D6-373.000.

Farrell, Thomas M. Desk set or similar article having a bi-cylindric figurine and figurine holder. 277,946, 3-12-85, Cl. D11-131.000.

Field, Frank P. Dispensing shelf attachment. 277,915, 3-12-85, Cl. D6-574.000.

Firestone Tire & Rubber Co., The: *See*—
Molnar, Joseph F.; and Wallet, Bill J., 277,951, Cl. D12-147.000.

Fortuna, Vincent E., to Cosden Technology, Inc. Combined closure and pouring spout therefor. 277,937, 3-12-85, Cl. D9-447.000.

Frosta Fritid Aktiebolaget: *See*—
Larsjos, Ake, 277,974, Cl. D21-238.000.

Garnier, Mary J. Holiday ornament. 277,945, 3-12-85, Cl. D11-125.000.

Gholson, G. James, Jr. Clarinet ligature. 277,967, 3-12-85, Cl. D17-13.000.

Gillette Company, The: *See*—
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ISSUED MARCH 12, 1985

NOTE.—First number, class; second number, subclass; third number, patent number

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75 4,503,845
80 C 4,503,846
92 BC 4,503,847
92 D 4,503,848
133 4,503,849
201.25 4,503,850
203.29 4,503,851
204.26 4,503,852
303.1 4,503,853
4,503,854
303.15 4,503,855
314 4,503,856
419 PG 4,503,857
419 PT 4,503,858
635 4,503,859
639 4,503,860
661 4,503,861
736 4,503,862
741 4,503,863
760 4,503,864
774 4,503,865

CLASS 131

84 C 4,503,866
95 4,503,867
282 4,503,868
336 4,503,869

CLASS 132

9 4,503,870
84 B 4,503,871
88.5 4,503,872

CLASS 134

1 4,504,322
104 4,503,873
167 R 4,503,874

CLASS 137

83 4,503,875
101 4,503,876
119 4,503,877
315 4,503,878
4,503,879
377 4,503,880
425 4,503,881
454.5 4,503,882
458 4,503,883
553 4,503,884
557 Re.31,845
574 4,503,885
596 4,503,886
624.13 4,503,887
625.65 4,503,888

CLASS 139

1 R 4,503,889
92 4,503,890
116 4,503,891

CLASS 144

3 P 4,503,892
176 4,503,893
193 A 4,503,894
369 4,503,896
373 4,503,895

CLASS 145

1 R 4,503,897

CLASS 148

1.5 4,504,323
6.15 R 4,504,324
6.2 4,504,325
12 C 4,504,326
31.55 4,504,327
171 4,504,328
175 4,504,329
4,504,330
4,504,331
187 4,504,332
4,504,333
191 4,504,334

CLASS 152

209 R 4,503,898

CLASS 156

42 4,504,335
64 4,504,336
4,504,337
79 4,504,338
89 4,504,339
4,504,340
102 4,504,341
138 4,504,342
177 4,504,343
185 4,504,344
213 4,504,345

242 4,504,346
245 4,504,347
251 4,504,348
272.6 4,504,349
380.8 4,504,350
391 4,504,351
499 4,504,352
4,504,353
639 4,504,354

CLASS 159

3 4,504,355

CLASS 160

133 4,503,899
172 4,503,900

CLASS 162

29 4,504,356
123 4,504,357
264 4,504,358
274 4,504,359
343 4,504,360

CLASS 164

212 4,503,901

CLASS 165

47 4,503,902
76 4,503,903
4,503,904
4,503,905
104.21 4,503,906
133 4,503,907
167 4,503,908

CLASS 166

252 4,503,909
263 4,503,910
272 4,503,911
295 4,503,912
319 4,503,913

CLASS 168

18 4,503,914

CLASS 169

15 4,503,915

CLASS 172

3 4,503,916

CLASS 173

147 4,503,917

CLASS 174

21 R 4,504,695
32 4,504,696
52 R 4,504,697
66 4,504,698
84 R 4,504,699

CLASS 175

27 4,503,918
269 4,503,919
394 4,503,920

CLASS 177

147 4,503,921
210 EM 4,503,922
212 4,503,923

CLASS 178

18 4,504,700

CLASS 179

2.51 4,504,705
84 T 4,504,701
99 A 4,504,702
102 4,504,703
115.5 DV 4,504,704

CLASS 180

8.6 4,503,924
13 4,503,925
75.2 4,503,926
247 4,503,927
308 4,503,928

CLASS 181

118 4,503,929
145 4,503,930
204 4,503,931

CLASS 182

113 4,503,932
231 4,503,933

CLASS 184

1.5 4,503,934

CLASS 187

9 E 4,503,935
9 R 4,503,936
29 R 4,503,937
4,503,938
4,503,939
4,503,940
4,503,941
95 4,503,942

CLASS 188

5 4,503,943
71.6 4,503,944
71.8 4,503,945
71.9 4,503,946
72.8 4,503,947
4,503,948
79.5 P 4,503,949
196 R 4,503,950
280 4,503,951
306 4,503,952
330 4,503,953
331 4,503,954

CLASS 190

107 4,503,955

CLASS 192

3.31 4,503,956
4 C 4,503,957
12 R 4,503,958
70.3 4,503,959
127 4,503,960

CLASS 194

1 C 4,503,961
1 G 4,503,962
4 C 4,503,963

CLASS 198

341 4,503,964
347 4,503,965
382 4,503,966
419 4,503,967
472 4,503,968
621 4,503,969
781 4,503,970
833 4,503,971

CLASS 200

11 R 4,504,706
42 R 4,504,707
48 V 4,504,708
52 R 4,504,709
80 R 4,504,710
144 B 4,504,711
159 R 4,504,712
241 4,504,713

CLASS 202

172 4,504,361

CLASS 203

3 4,504,362
14 4,504,363
45 4,504,364

CLASS 204

1 R 4,504,366
1 T 4,504,365
4,504,367
4,504,368
67 4,504,369
129.1 4,504,370
158 R 4,504,371
159.15 4,504,372
180 P 4,504,373
181 C 4,504,374
196 4,504,375

CLASS 206

379 4,503,972
386 4,503,973
457 4,503,974
486 4,503,975

CLASS 208

25 4,504,376
75 4,504,377
108 4,504,378
113 4,504,379
4,504,380
4,504,381
114 4,504,382
179 4,504,383

CLASS 209

166 4,504,384
4,504,385
254 4,504,386
546 4,503,976
564 4,503,977

CLASS 210

101 4,504,387
150 4,504,388
266 4,504,389
307 4,504,391
333.1 4,504,390
471 4,504,392
614 4,504,393
632 4,504,394
712 4,504,395
800 4,504,396
804 4,504,397

CLASS 211

13 4,503,978
41 4,503,980
45 4,503,979
69.5 4,503,981
184 4,503,982

CLASS 212

187 4,503,983
205 4,503,984

CLASS 215

252 4,503,985
4,503,986
329 4,503,987

CLASS 219

9.5 4,504,714
10.55 B 4,504,716
4,504,718
10.55 C 4,504,719
10.55 E 4,504,717
10.55 F 4,504,715
10.77 4,504,720
69 M 4,504,721
69 P 4,504,722
85 F 4,504,723
86.25 4,504,724
4,504,725
121 LB 4,504,727
121 LH 4,504,726
125.1 4,504,728
137 R 4,504,729
411 4,504,730
457 4,504,731
497 4,504,732
521 4,504,733
550 4,504,734

CLASS 220

90.4 4,503,992
219 4,503,988
269 4,503,989
276 4,503,990
339 4,503,991

CLASS 221

10 4,503,993

CLASS 222

64 4,503,994
219 4,503,995
321 4,503,996
4,503,997
341 4,503,998
402.16 4,503,999

CLASS 223

107 4,504,000

CLASS 224

198 4,504,001
211 4,504,002

CLASS 225

96.5 4,504,003

CLASS 226

150 4,504,004
190 4,504,005

CLASS 227

152 4,504,006

CLASS 228

123 4,504,007
180.2 4,504,008

CLASS 229

5.5 4,504,009

CLASS 235

50 A 4,504,735

CLASS 236

46 F 4,504,010

CLASS 237

14 4,504,011

CLASS 238

10 F 4,504,012

CLASS 239

424 4,504,013
433 4,504,014

CLASS 241

3 4,504,015
24 4,504,016
40 4,504,017
53 4,504,018
73 4,504,019
121 4,504,020

CLASS 242

18.1 4,504,021
4,504,024
47.01 4,504,022
54 R 4,504,023
55.19 R 4,504,025
71.1 4,504,026
74.1 4,504,027
198 4,504,028

CLASS 244

54 4,504,029
57 4,504,030
113 4,504,031
170 4,504,032
4,504,033

CLASS 248

63 4,504,034
559 4,504,035
632 4,504,036

CLASS 250

256 4,504,736
327.2 Re.31,847
435 4,504,737
483.1 4,504,738
519.1 4,504,739
578 4,504,740

CLASS 251

1 A 4,504,037
58 4,504,038
65 4,504,039
121 4,504,040

CLASS 252

8.55 D 4,504,399
8.55 R 4,504,400
8.6 4,504,398
8.75 4,504,401
33.4 4,504,404
68 4,504,403
70 4,504,402
106 4,504,405
143 4,504,406
162 4,504,407
301.16 4,504,408
351 4,504,409
358 4,504,410
506 4,504,411
522 R 4,504,412

CLASS 254

9 R 4,504,041

CLASS 260

112 R 4,504,413
112.5 LH 4,504,414
112.5 R 4,504,415
438.1 4,504,417
463 4,504,418
465 D 4,504,419
465.3 4,504,420
465.6 4,504,421
4,504,422
465.7 4,504,423
513.6 4,504,424

CLASS 261

50 A 4,504,425
114 R 4,504,426

CLASS 264

22 4,504,434
25 4,504,427
34 4,504,428
40.5 4,504,429
46.4 4,504,430
105 4,504,431
177 F 4,504,432
232 4,504,433
272.17 4,504,435
321 4,504,436

CLASS 266

115 4,504,042
160 4,504,043

CLASS 267

35 4,504,044

CLASS 269

21 4,504,045
24 4,504,046
43 4,504,047
71 4,504,048
328 4,504,050

CLASS 270

40 4,504,051

CLASS 271

9 4,504,052
34 4,504,053

CLASS 273

54 B 4,504,054
85 G 4,504,055
88 4,504,056
119 R 4,504,057
143 R 4,504,058
148 B 4,504,059
241 4,504,060
250 4,504,061
313 4,504,062
422 4,504,063

CLASS 277

12 4,504,064
4,504,065
84 4,504,066
153 4,504,067
164 4,504,068
174 4,504,069

CLASS 279

1 C 4,504,070

CLASS 280

5.24 4,504,071
11.31 4,504,072
33.99 A 4,504,073
93 4,504,074
402 4,504,075
411 A 4,504,076
490 R 4,504,077
615 4,504,078
683 4,504,079
704 4,504,080
714 4,504,081
735 4,504,082

CLASS 283

77 4,504,083
94 4,504,084

CLASS 285

119 4,504,085
156 4,504,086

CLASS 292

347 4,504,087

CLASS 294

65.5 4,504,088

CLASS 296

165 4,504,049

CLASS 297

214 4,504,089
342 4,504,090
362 4,504,091

CLASS 299

5 4,504,092
37 4,504,093

CLASS 301

6 R 4,504,094
63 R 4,504,095

CLASS 307

228 4,504,741
252 N 4,504,742
310 4,504,743
456 4,504,744
473 4,504,745
475 4,504,746
4,504,747
530 4,504,748
590 4,504,749

CLASS 308

3 A 4,504,096
6 C 4,504,097
10 4,504,098

CLASS 310

12 4,504,750
62 4,504,751
68 R 4,504,752
75 R 4,504,753
90 4,504,754
156 4,504,755
168 4,504,756
308 4,504,757
313 C 4,504,759
313 R 4,504,758
323 4,504,760
800 4,504,761

CLASS 312

71 4,504,100

CLASS 313

30 4,504,762
318 4,504,763
403 4,504,764
481 4,504,765
634 4,504,766

CLASS 315

101 4,504,767
248 4,504,768
360 Re.31,848

CLASS 318

345 H 4,504,769
560 4,504,770
561 4,504,771
603 4,504,772

CLASS 320

1 4,504,773
9 4,504,774
32 4,504,775

CLASS 323

288 4,504,776
300 4,504,777
323 4,504,778
349 4,504,779

CLASS 324

72.5 4,504,780
4,504,781
73 PC 4,504,782
73 R 4,504,783
4,504,784
77 H 4,504,785
78 R 4,504,786
142 4,504,787
316 4,504,788
418 4,504,789
639 4,504,790

CLASS 328

15 4,504,791

CLASS 329

106 4,504,792

CLASS 330

10 4,504,793
254 4,504,794
277 4,504,795
286 4,504,796
293 4,504,797
296 4,504,798

CLASS 331

1 A 4,504,799
4,504,800
117 D 4,504,801

CLASS 332

18 4,504,802
31 R 4,504,803
4,504,804

CLASS 333

126 4,504,805
241 4,504,806

CLASS 335

61 4,504,807
154 4,504,808
208 4,504,809
261 4,504,810

CLASS 336

10 4,504,811
84 C 4,504,812
216 4,504,813

CLASS 337

112 4,504,814
201 4,504,815
255 4,504,816

CLASS 338

23 4,504,817
119 4,504,818

CLASS 339

17 L 4,504,101
18 R 4,504,102
34 4,504,103
63 R 4,504,104
75 MP 4,504,105
75 P 4,504,106
125 R 4,504,107
128 4,504,108

CLASS 340

60 4,504,819
81 R 4,504,820
146.2 4,504,821
561 4,504,822
602 4,504,823
680 4,504,824
709 4,504,825
721 4,504,826
723 4,504,827
735 4,504,828
756 4,504,829
815.31 4,504,830
870.03 4,504,831
870.37 4,504,832

CLASS 343

5 NA 4,504,833
749 4,504,834
755 4,504,835
761 4,504,836

CLASS 346

1.1 4,504,837
46 4,504,838
75 4,504,839
76 PH 4,504,840
104 4,504,841
137 4,504,842
138 4,504,843
140 R 4,504,844
4,504,845

CLASS 350

1.6 4,504,109
6.3 4,504,110
96.20 4,504,111
96.23 4,504,112
96.33 4,504,113
96.34 4,504,114
336 4,504,119
357 4,504,120
385 4,504,121
388 4,504,122
394 4,504,123
427 4,504,124
4,504,125
469 4,504,126
626 4,504,118
636 4,504,117
637 4,504,116

CLASS 351

86 4,504,127
167 4,504,128
206 4,504,129

CLASS 352

92 4,504,130

CLASS 354

173.1 4,504,131
195.1 4,504,132
266 4,504,133
272 4,504,134
402 4,504,135

CLASS 355

3 DD 4,504,136
4 4,504,137
10 4,504,138
14 R 4,504,139
71 4,504,140
77 4,504,141
92 4,504,142

CLASS 356

5 4,504,143
150 4,504,144
300 4,504,145
350 4,504,146
363 4,504,147
401 4,504,148

CLASS 357

12 4,504,846
22 4,504,847
24 4,504,848
67 4,504,849
79 4,504,850

CLASS 358

10 4,504,851
11 4,504,852
37 4,504,853
44 4,504,854
4,504,855
92 4,504,856
99 4,504,857
111 4,504,858
4,504,859
133 4,504,860
143 4,504,861
158 4,504,862
167 4,504,863
4,504,864
213 4,504,865
4,504,866
247 4,504,867
260 4,504,115
280 4,504,868
312 4,504,869

CLASS 360

25 4,504,870
31 4,504,871
40 4,504,872
63 4,504,873
66 4,504,874
72.1 4,504,875
94 4,504,876
96.2 4,504,877
98 4,504,878
105 4,504,879
113 4,504,880

CLASS 361

23 4,504,881
93 4,504,882
119 4,504,883
323 4,504,884
342 4,504,885
386 4,504,886
399 4,504,887

CLASS 362

18 4,504,888
200 4,504,889
203 4,504,890
219 4,504,891
234 4,504,892
253 4,504,893
296 4,504,894

CLASS 363

17 4,504,895
21 4,504,896
39 4,504,897
49 4,504,898
56 4,504,899

CLASS 364

140 4,504,900
200 4,504,901
4,504,902
4,504,903
4,504,904
4,504,905
4,504,906
4,504,907
414 4,504,908
4,504,909
424 4,504,910
426 4,504,911
434 4,504,912
449 4,504,913
456 4,504,914
466 4,504,915
471 4,504,916
474 4,504,917
478 4,504,918
4,504,919
550 4,504,920
4,504,921
557 4,504,922
728 4,504,923
787 4,504,924
900 4,504,925
4,504,926
4,504,927

CLASS 365

11 4,504,928
210 4,504,929
238 4,504,930

CLASS 366

4 4,504,149
80 4,504,150
156 4,504,151
188 4,504,152

CLASS 367

115 4,504,931
183 4,504,932
197 4,504,933

CLASS 368

10 4,504,153
74 4,504,154
121 4,504,155

CLASS 369

18 4,504,934
32 4,504,935
34 4,504,936
44 4,504,937
45 4,504,938
46 4,504,939
126 4,504,940
170 4,504,941

CLASS 370

58 4,504,942
79 4,504,943
84 4,504,944
88 4,504,945
95 4,504,946
99 4,504,947

CLASS 371

38 4,504,948

CLASS 372

3 4,504,949
20 4,504,950
38 4,504,951
45 4,504,952
56 4,504,953
61 4,504,954
76 4,504,955

CLASS 373

130 4,504,957

CLASS 374

45 4,504,156
109 4,504,157

CLASS 375

12 4,504,958
36 4,504,959
94 4,504,960

CLASS 376

153 4,504,437
156 4,504,438
391 4,504,439

CLASS 377

8 4,504,961

CLASS 378

19 4,504,962
53 4,504,963
107 4,504,956
119 4,504,964
132 4,504,965

CLASS 381

15 4,504,966
65 4,504,967
103 4,504,968

CLASS 382

10 4,504,969
14 4,504,970
26 4,504,971
51 4,504,972

CLASS 384

543 4,504,099

CLASS 400

144.2 4,504,158
148 4,504,159
196.1 4,504,160
605 4,504,161
621 4,504,162

CLASS 401

53 4,504,163

CLASS 403

109 4,504,164
129 4,504,165
147 4,504,166
325 4,504,167
353 4,504,168

CLASS 404

11 4,504,169
55 4,504,170

CLASS 405

154 4,504,171
217 4,504,172
240 4,504,173
252 4,504,174
260 4,504,175
271 4,504,176

CLASS 406

86 4,504,177

CLASS 409

138 4,504,178
234 4,504,179

CLASS 411

5 4,504,180

CLASS 413

17 4,504,181

CLASS 414

225 4,503,798
327 4,504,182
412 4,504,183
498 4,504,184
700 4,504,185
744 A 4,504,186

CLASS 415

1 4,504,187
4,504,188
115 4,504,189
166 4,504,190

CLASS 416

5 4,504,191
41 4,504,192
140 4,504,193

CLASS 417

48 4,504,194
172 4,504,195
355 4,504,196
404 4,504,197
417 4,504,198
456 4,504,199
476 4,504,200

CLASS 418

3 4,504,201
150 4,504,202
201 4,504,203

CLASS 419

3 4,504,440
35 4,504,441

CLASS 422

37 4,504,442
81 4,504,443
100 4,504,444
186.15 4,504,445
186.19 4,504,446
204 4,504,447

CLASS 423

54 4,504,448
228 4,504,449
239 4,504,450
242 4,504,451
341 4,504,452
345 4,504,453
447.1 4,504,454
447.6 4,504,455
473 4,504,456
474 4,504,457
552 4,504,458
573 G 4,504,459
580 4,504,460
593 4,504,461

CLASS 424

1.1 4,504,462
4,504,463
63 4,504,464
65 4,504,465
72 4,504,466
118 4,504,467
147 4,504,468
195.1 4,504,473

CLASS 425

11 4,504,204
181 4,504,205
326.1 4,504,206
385 4,504,207
397 4,504,209
461 4,504,210
589 4,504,208

CLASS 426

11 4,504,496
130 4,504,497
238 4,504,498
250 4,504,499
265 4,504,500
284 4,504,501
293 4,504,502
312 4,504,503
321 4,504,504
482 4,504,505
485 4,504,506
533 4,504,507
535 4,504,508
549 4,504,509
553 4,504,510
565 4,504,511
579 4,504,512
632 4,504,513
634 4,504,514
641 4,504,515
658 4,504,516

CLASS 427

13 4,504,517
38 4,504,518
39 4,504,519
44 4,504,520
85 4,504,521
103 4,504,522
197 4,504,523
230 4,504,524
4,504,525
248.1 4,504,526
318 4,504,527
389.8 4,504,528
437 4,504,529

CLASS 428

35 4,504,530
4,504,531
36 4,504,532
70 4,504,533
71 4,504,534
137 4,504,535
151 4,504,536
167 4,504,537
4,504,538
195 4,504,539
4,504,540
264 4,504,541
336 4,504,542
338 4,504,543
357 4,504,544
364 4,504,545
375 4,504,546
407 4,504,547
419 4,504,551
426 4,504,548
447 4,504,549
461 4,504,550
620 4,504,552
622 4,504,553
683 4,504,554
689 4,504,555

CLASS 429

101 4,504,561
136 4,504,556
192 4,504,557

CLASS 430

30 4,504,558
58 4,504,559
72 4,504,560
106.6 4,504,562
109 4,504,563
132 4,504,564
138 4,504,565
156 4,504,566
165 4,504,567
203 4,504,568
214 4,504,569
217 4,504,570
253 4,504,571
264 4,504,572
288 4,504,573
331 4,504,574
531 4,504,575
538 4,504,576
564 4,504,577
621 4,504,578

CLASS 431

3 4,504,211
86 4,504,212
116 4,504,213
121 4,504,214
168 4,504,215
183 4,504,216
4,504,217
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61 4,504,622
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133 4,504,626
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119	4,504,637
134	4,504,638
146	4,504,639
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185	4,504,650
360	4,504,651
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491	4,504,653
499	4,504,654

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255	4,504,662

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243	4,504,664
318	4,504,665
345	4,504,666
	4,504,667

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120	4,504,668
241	4,504,669

CLASS 549

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CLASS 560

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131	4,504,672
180	4,504,673
202	4,504,674
233	4,504,675
244	4,504,676

CLASS 562

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534	4,504,677

CLASS 564

67	4,504,679
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267	4,504,681
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CLASS 568

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454	4,504,684
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684	4,504,686
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778	4,504,688
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466	4,504,690
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520	4,504,693
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643	4,504,694

CLASS 604

22	4,504,264
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86	4,504,265
118	4,504,266
134	4,504,267
170	4,504,268
272	4,504,269
275	4,504,270

CLASSIFICATION OF DESIGNS

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D3—	32	277,901
	36	277,902
		277,903
	53	277,904
D6—	352	277,906
	372	277,907
	373	277,908
	407	277,905
	431	277,914
	501	277,916
	507	277,909
	523	277,911
	545	277,910
	570	277,913
	574	277,915
	604	277,917
	608	277,918
D7—	5	277,919
		277,920
	9	277,921
	43	277,922
	379	277,923
	412	277,924
D8—	37	277,925
	41	277,926
	45	277,927
	50	277,928
	70	277,930
		277,931
	71	277,932
	350	277,933
	382	277,935
	395	277,934
D9—	307	277,936
	447	277,937
D10—	60	277,938
	71	277,939
		277,940
	83	277,941
D11—	90	277,942
	104	277,943
	121	277,944
	125	277,945
	131	277,946
D12—	112	277,947
	126	277,948
	131	277,949
	147	277,950
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	159	277,952
	208	277,953
D13—	1	277,954
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D14—	33	277,956
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	58	277,929
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	70	277,959
	73	277,960
	78	277,961
	106	277,962
	107	277,963
	109	277,964
D15—	90	277,965
D16—	32	277,966
D17—	13	277,967
D18—	1	277,968
D19—	34.1	277,912
	75	277,969
D21—	59	277,970
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	209	277,973
	238	277,974
	242	277,975
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D23—	2	277,977
	17	277,978
D24—	1.1	277,979
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	64	277,986
D28—	48	277,987
D30—	14	277,988
	45	277,989
D32—		277,990
D34—	20	277,991
	28	277,992
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DESIGN PATENTS

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53 : 277,925
55 : 277,963

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06 : 5,413
5,414
5,416
25 : 5,415

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